



THE CITY OF NEW YORK

**Comments of the City of New York on the United States
Environmental Protection Agency's
Draft Monitoring Well Installation Plan for the Gowanus Canal**

April 15, 2010

EXECUTIVE SUMMARY

In a letter issued on April 5, 2010, the United States Environmental Protection Agency (EPA) restated its commitment to work cooperatively with the City of New York (City) to advance EPA's investigation of the Gowanus Canal Superfund Site. As part of this commitment, EPA stated, among other things, its intent to review and consider comments submitted by the City on technical work plans, and to ensure a "vigorous and fair potentially responsible party search process." The City appreciates EPA's statements of cooperation and this report has the dual purpose of providing EPA with technical comments on its Draft Monitoring Well Installation Plan (MWIP) for the Gowanus Canal, and to provide EPA with a basis for investigating other entities potentially responsible for the contamination affecting the Gowanus Canal. The City respectfully requests that EPA include this report in the administrative record for the Gowanus Canal Superfund Site.

The City's central concern with EPA's draft MWIP is that it does not include an adequate number of proposed groundwater monitoring wells to appropriately characterize current and former industrial upland properties which may have historically and may continue presently to impacts contribute hazardous substances and petroleum contamination to the Gowanus Canal. The City is also concerned that this could have problematic effects on the remedial investigation of the Gowanus Canal, because it will not identify existing upland industrial source areas that are contributing hazardous waste and petroleum contamination to the Canal through discharges to the groundwater aquifer that is hydrogeologically connected to the Gowanus Canal. If these existing sources are not thoroughly characterized and controlled, they may ultimately undermine the remedy that is designed and implemented for the Canal.

The following report provides specific recommendations of where EPA should construct additional groundwater monitoring, and how EPA should use this information in its remedial investigation of the Gowanus Canal. The City would welcome the opportunity to further discussion the analysis and recommendations made in this report with EPA in the near future.

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1. SITE BACKGROUND

1.1. PURPOSE OF THIS REPORT

The City of New York (the City) has performed a technical review and prepared this comment memorandum in response to the United States Environmental Protection Agency (EPA) Draft Monitoring Well Installation Plan (MWIP) for the Gowanus Canal (Canal) Superfund Site (Site) located in Brooklyn, New York (see Figure 1). This report evaluates potential ongoing groundwater contaminant sources from certain upland industrial properties in the Gowanus Canal drainage basin that, if not properly identified and addressed under the EPA's Superfund Remedial Investigation/Feasibility Study (RI/FS), may compromise the Remedial Action in the Gowanus Canal through recontamination.

1.2 PHYSICAL SETTING

The Gowanus Canal is situated in an industrial section of south Brooklyn, to the west of the Park Slope neighborhood, to the east of the Carroll Gardens/Cobble Hill neighborhoods, and to the south of the Boerum Hill neighborhood (GEI, 2007). The Canal is approximately 7,700 feet long and 100 feet wide, beginning just southwest of Butler Street, extending past the Gowanus Expressway, and finally emptying into the Gowanus Bay. Three barge basins, totaling approximately 2,100 feet in length, are connected to the main channel on the eastern side. One basin is opposite 4th Street, one lies between 5th and 6th Streets, and a third lies opposite 7th Street. An additional, smaller basin is directly opposite 11th street.

The Canal is a brackish, man-made, tidal arm of the New York-New Jersey Harbor Estuary. The Canal was constructed by bulkheading and dredging a previously existing tidal creek and wetland. The historical surface water elevation of this former tidal creek and wetland system was an expression of the former shallow groundwater table. This indicates that the Gowanus Creek and wetland complex was the discharge boundary for groundwater and surface water originating in the Gowanus watershed. Topographic elevations in the Gowanus Canal watershed range from approximately 150 feet MSL in the upland areas to less than 10 feet MSL along the Canal (EPA, 2009). The Gowanus Canal is situated at the lowest topographic elevation in the watershed and is in direct hydraulic communication with the groundwater; therefore, the Canal continues to serve as the discharge point for groundwater and surface water draining from the watershed.

The geology of the Gowanus Canal watershed is comprised of four main subsurface deposits which are, from top to bottom, as follows:

- 1) Urban Fill
- 2) Alluvial/Marsh Deposits
- 3) Glacial Deposits
- 4) Bedrock

Urban fill materials consist of a mixture of silt, sand and gravel with various amounts of metal fragments, glass, cement, brick, concrete and wood. The fill material is likely associated with the filling of the former Gowanus Creek wetland complex landward of the installed bulkhead.

Alluvial/marsh deposits are generally encountered below the fill materials. These deposits are comprised of sand (alluvial), silt, silty-sand, sandy-clay, clay and peat. These deposits are likely attributable to the original Gowanus Creek, which occupied the current location of the Canal and portions of the surrounding area.

Glacial deposits are generally encountered beneath the alluvial/marsh deposits, and are likely present beneath the fill material or alluvium throughout the watershed. The glacial deposits are comprised of permeable sandy glacial outwash. Bedrock consisting of the Fordham Gneiss (GEI, 2005) is encountered beneath the glacial deposits in the Gowanus Canal watershed. The Fordham Gneiss is described as a metamorphosed, medium to coarse-grained igneous rock unit of Precambrian Age (P.C. Brock and P.W.G. Brock, 2001). Bedrock elevations within the vicinity of the Gowanus Canal range from –100 feet National Geodetic Vertical Datum (NGVD) to –200 feet NGVD (Buxton, *et al.*, 1981). During previous investigations in the region, bedrock was observed in soil borings completed at the Carroll Gardens/Public Place adjacent to the Canal at elevations of -127 feet NGVD to -156 feet NGVD (GEI, 2005).

The glacial outwash deposits described above, when saturated, comprise the Upper Glacial Aquifer. This hydrostratigraphic unit is the main aquifer underlying the Canal and surrounding uplands. This unit is generally unconfined (water table); however, it can be locally confined by the presence of silt and clay layers of alluvial and marsh deposits. Regional groundwater flow within the deeper portions of the Upper Glacial Aquifer is to the west to southwest towards Upper New York Harbor. Shallow groundwater flow within the fill unit, alluvial/marsh deposits and upper portions of the glacial deposits in the upland area surrounding the Canal is towards the Canal. Figure 2a is a USGS Potentiometric Surface/Groundwater Elevation Contour Map (USGS, 2006) for the Upper Glacial deposits for 2006. The USGS 2006 Groundwater Contour Map did not present the 5-foot MSL groundwater contour; however, this contour was inferred from the USGS monitoring well data.

As presented on Figure 2b, groundwater in the upland areas surrounding the Canal flows towards and discharges to the Canal (*i.e.*, flow from upland recharge area including upland industrial properties to the Canal discharge area). Immediately adjacent to the Canal and in upland areas surrounding the Canal, groundwater is typically encountered from 6 to 18 feet below grade. The saturated glacial outwash deposits are highly permeable and transmissive and groundwater flow

within these deposits can be on the order of 0.5-1.0 foot per day. The alluvial/marsh deposits of the Upper Glacial Aquifer are typically less permeable than the underlying glacial deposits and may create locally confined conditions where present (Busciolano, 2002).

Historical groundwater withdrawals in South Brooklyn from the early through mid-20th century had dramatic effects on the elevation of the water table and the groundwater flow regime within the vicinity of the Gowanus Canal (USGS Open File report 81-1186). As stated earlier, the natural shallow groundwater flow gradient is towards the Canal (and upland contaminant releases to underlying groundwater would have the potential to discharge to the Canal). However, large groundwater withdrawals (as much as about 60 mgd in the mid-teens, peaking at around 70 mgd in the late 1920s, and continuing at approximately 60 mgd until the late 1940s) temporarily reversed the natural water table and flow regime in the vicinity of the Site.

During this period of heavy withdrawal, groundwater would have ceased discharging to the Canal. It is also possible that water in the Canal may have been recharging the surrounding groundwater, both laterally from its sides and downward through the sediment bed (*i.e.*, the Canal bottom), carrying contaminants from the Canal with it. Due to this reverse in flow direction, contaminants released to the subsurface in upland areas could have been pulled down to deeper portions of the aquifer as the vertical hydraulic gradients in the upland areas increased with greater groundwater withdrawal rates in the first half of the 20th century.

In 1947, all withdrawal for potable use ceased due to saltwater intrusion. By the mid 1950's, groundwater began to transition back to pre-pumping conditions and to flow towards the Canal. As the water table recovered after the termination of significant pumping, contamination may well have been "trapped" below the water table – at least temporarily. As a result, it would not be surprising to find contamination, such as DNAPLs and PAHs from MGP-related tars, and other contaminants pulled below the current elevation of the water table beneath industrial source properties in upland areas around the Gowanus Canal. Ambient, pre-pumping hydraulic conditions were fully restored by 1981 (as shown in Figures 3a and 3b) and, therefore, upland contaminant releases to underlying groundwater and the historical "trapped" contamination would be discharging to the Canal.

1.3 NATURE AND EXTENT OF CONTAMINATION

As early as 1869, areas adjacent to the Canal were occupied by industry, including lumber yards, coal yards, a concrete plant and stone yards along with other industrial development (Dripps, 1869). The continued expansion of commercial and industrial activities was noted along the Canal from the late 1800s into the early 1940s. Historical land use in the Canal basin was mostly heavy industry including manufacturing gas plants (MGPs), coal yards, cement makers, soap makers, tanneries, paint and ink factories, machine shops, chemical plants, oil refineries and storage facilities. Although the Site has been used extensively by various industries for the past 140 years, industrial activities have only been subject to governmental environmental regulations for the past few decades, and only after most industrial activity and related onsite petroleum and hazardous waste disposal had ceased. Compared to the total number of industrial properties,

there have been relatively few cleanup activities on upland industrial properties under governmental regulatory programs.

Current industrial land use immediately adjacent to the Canal is greatly reduced from past peak activity and is primarily devoted to commercial and industrial facilities including concrete plants, fuel oil storage, and warehouses.

Based on previous investigations, the Gowanus Canal sediments are contaminated with elevated concentrations of VOCs, semi-volatile organic compounds (SVOCs), PAHs, pesticides, PCBs, total cyanide (TCN) and metals. In addition, DNAPLs/coal tar were widely encountered at various depths in accumulated Canal sediments as well as beneath the Canal in the native alluvial/marsh and glacial deposits. Figure 4 depicts the centerline cross-section and general contaminant distribution within the accumulated sediments and underlying native deposits. As shown in this figure DNAPL/coal tars are present in the accumulated sediment layer and extend well into the native deposits below the bottom of the Canal. The detection of these contaminants in the native deposits are likely attributable to the migration of these contaminants via groundwater from upland industrial properties, which is one profound example of a continued, ongoing source of upland industrial contamination discharging into the Canal.

Unlike most land-based CERCLA sites, the Gowanus Canal is not the original source of the contaminants it now contains. Although the RI has not yet determined the full nature and extent of contamination, contaminants already detected in Canal sediments and underlying native deposits are likely to be widespread in soils beneath upland industrial facilities from which they likely originated, thus potentially representing ongoing sources of hazardous waste and petroleum migration to the Canal. This assertion is informed by previous groundwater analytical results from limited upland investigations, which have detected concentrations of VOCs, SVOCs, PAHs, pesticides, PCBs, TCN, metals, LNAPLs DNAPLs/coal tar, methyl-tert butyl ether (MTBE), and petroleum-based hydrocarbons, including benzene, toluene, ethyl benzene, and xylene (BTEX compounds). In summary, contaminants found in Canal sediment, surface water and from ongoing discharge to the Canal, can, in large measure, be reasonably attributed to industrial activities on upland properties, including direct and indirect waste disposal to the Canal, during more than 140 years of industrial activity.

1.4 EPA's DRAFT MONITORING WELL INSTALLATION PLAN

The Draft MWIP prepared by EPA proposes a limited groundwater and hydrogeological investigation of the watershed surrounding the Gowanus Canal and evaluation of associated contamination in support of the EPA-lead RI of the Site. According to the scope of work included in the EPA's Draft MWIP and the monitoring well location figure, which accompanies the Draft MWIP and presented as Appendix B in this report, the hydrogeological investigation consists of the installation and sampling of 30 well clusters in the shallow and intermediate depth overburden soils to obtain data for the groundwater relative to the base of the canal. Of the 30 well clusters, 15 are on what EPA identified as six city-owned properties. The remaining 15 well

clusters are proposed to be installed on public street ends along the Canal and other private properties that are presumably identified as PRPs by EPA.

Each well cluster consists of a shallow and an intermediate well. Shallow monitoring wells will be installed straddling the water table, depending on relative proximity to the Canal. Intermediate monitoring wells will be designed, so that the top of the screen is positioned approximately 5 feet below the native sediment. All 2-inch monitoring wells will be installed using hollow stem auger drilling techniques with 4¼-inch inner diameter augers. Continuous split-spoon soil samples will be collected to facilitate lithologic logging of each monitoring well location. All soils will be field-screened for organic vapors using a photoionization detector, and classified. Following the installation of all new monitoring wells, one round of groundwater sampling will be completed. All groundwater sampling activities will be performed in accordance with USEPA Region II Low-Flow Groundwater Purging and Sampling Procedures. Groundwater samples will be analyzed for TCL organics and TAL metals, including mercury and cyanide.

Based on communications with EPA, National Grid will install three intermediate wells at the Former Fulton MGP to supplement existing shallow wells and sample the 13 existing wells at the former Fulton, Carroll Gardens, and Metropolitan MGP sites will also be sampled. EPA will then use the data collected from the new and existing monitoring wells in the evaluation of groundwater to surface water interaction around the Canal and the potential for groundwater contribution to the Canal surface water body.

In addition, EPA's Draft MWIP consists of a continuous water elevation measurement in selected monitoring wells and Canal for one week to evaluate tidal influences, and synoptic monthly water elevation measurements in monitoring wells and Canal for one year.

1.5 EPA's CONTAMINATED SEDIMENT REMEDIATION GUIDANCE SUMMARY

The City believes that a properly-designed upland investigation program is essential to discern the origin, transport and fate of hazardous waste and petroleum that continue to discharge into Gowanus Canal from upland industrial properties, and is crucial for a successful remediation of the Canal; a shared goal for the City and EPA. The City has reviewed applicable EPA guidance regarding the need for comprehensive Remedial Investigation (RI) of upland sources prior to remediation of contaminated sediment at hazardous waste sites (EPA, 2002; EPA, 2005) and respectfully submits the following technical recommendations regarding EPA's draft MWIP and any future upland investigations performed by EPA at the Gowanus Canal.

EPA's guidance documents indicate the need to identify all significant ongoing upland contaminant sources during the RI/FS process. For instance, EPA's *Contaminated Sediment Remediation Guidance* (EPA, 2005) which "provides technical and policy guidance for project managers and management teams making risk management decisions for contaminated sediment sites" states that "[c]ontrol of upland soils and other upland source materials is also critical to reducing risk in aquatic environments. . . [emphasis added]".

In addition, EPA's guidance document notes that cleanups are likely to be more complex at contaminated sediment sites compared to those with only soil or groundwater contamination. Among the complicating factors at sediment sites, the guidance highlights several factors that the City believes are particularly relevant to the Gowanus Canal upland RI/FS and subsequent Remedial Actions:

- *"Sediment sites may have a large number of sources, some of which can be ongoing and difficult to control"*
- *"Contamination is often diffuse and the sites are often large and diverse (e.g., mixed use, numerous property owners)"*

As the City understands, EPA guidance for remediation of contaminated sediment at hazardous waste sites is built around a series of 11 risk management principles (EPA, 2002; EPA, 2005). The following passages highlight those activities pertinent to upland contaminant source identification that EPA recommends occur during the RI/FS process prior to the remediation of a contaminated sediment hazardous waste site:

1. *"Control sources early*

*As early in the process as possible, site managers should try to identify all direct and indirect continuing sources of significant contamination to the sediments under investigation . . . site managers should assess which continuing sources can be controlled and by what mechanisms. It may be helpful to prioritize sources according to their relative contributions to site risks . . . **site managers should evaluate the potential for future recontamination of sediments when selecting a response action** [emphasis added]."*

2. *"Develop and refine a conceptual site model that considers sediment stability*

*A conceptual site model **should identify all known and suspected sources of contamination, the types of contaminants and affected media, existing and potential exposure pathways, and the known or potential human and ecological receptors that may be threatened.** . . . [t]he conceptual site model **should be prepared early and used to guide site investigations and decision-making.** However, it should be updated periodically whenever new information becomes available, and EPA's understanding of the site problems increases. In addition, it can frequently serve as the centerpiece for communication among all stakeholders. A conceptual site model is **especially important at sediment sites because the interrelationship of soil, surface and groundwater, sediment, and ecological and human receptors is often complex.** . . . Because sediments may experience temporal, physical, and chemical changes, it is especially important to understand what contaminants are currently available to humans and wildlife, and whether this is likely to change in the future under various scenarios [emphasis added]."*

3. *"Use an iterative approach in a risk-based framework*

EPA encourages the use of an iterative approach, especially at complex contaminated sediment sites. As used here, an iterative approach is defined broadly to include approaches which incorporate testing of hypotheses and conclusions and foster re-evaluation of site assumptions as new information is gathered.”

4. *“Select site-specific, project-specific, and sediment-specific risk management approaches that will achieve risk-based goals”*

EPA’s policy has been and continues to be that there is no presumptive remedy for any contaminated sediment site, regardless of the contaminant or level of risk.

1.6 EVALUATION OF THE DRAFT MWIP AS PERTAINS TO EPA GUIDANCE

As discussed, EPA guidance indicates that it is critical to identify and control significant ongoing upland industrial sources of contamination prior to implementing a remedy that addresses the contaminated sediment. An appropriately designed upland RI is essential in identifying such sources, which is a concern for the Gowanus Canal given EPA’s expedited timeline and plans to complete the RI by the end of 2010.

NYC’s review of EPA guidance documents and EPA’s draft MWIP leads the City to conclude that additional elements are required for the Gowanus Canal upland RI in order to best comply with technical recommendations in EPA’s contaminated sediment remediation guidance. In particular, as currently drafted, the City does not believe that EPA’s upland RI plans adequately identify all significant ongoing sources of hazardous waste and petroleum from the over 650 current, plus numerous former, upland industrial properties. Indeed, this is acknowledged in the EPA Hazard Ranking System Report that was used to nominate the Gowanus Canal to the National Priority List: *“The HRS site evaluation at proposal was based on the identification of the contaminated sediments in the Canal as a source. There are several hazardous substances affecting the Canal sediments, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, metals, and volatile organic compounds (VOCs). **The origin of these hazardous substances in the contaminated sediments has not been identified due to the presence of too many past and present possible sources.** As a result, the source(s) of all the contamination in any particular location in the Canal cannot be determined [emphasis added].”*

The City is concerned that without a sufficient upland RI scope, the subsequent remedial program will not be capable of identifying which upland industrial sources should be controlled, or what the potential impacts would be from ongoing industrial contaminant discharges to sediment recontamination.

Specifically, ongoing sources of contamination to the Gowanus Canal likely include light non-aqueous phase liquid discharges from oil refineries and storage facilities, dense non-aqueous phase liquid discharges from gas and tar manufacturers and storage facilities, heavy metals from

chemical and metal works facilities, and PCBs, VOCs, SVOCs, pesticides and other contaminants from a variety of historical and current upland industrial facilities along the Canal.

As per EPA guidance (EPA, 2002; EPA 2005), an essential element to develop early in the RI/FS process to guide decision-making, which is absent from the draft MWIP, is a Conceptual Site Model (CSM). The CSM typically identifies known and suspected upland industrial properties that are ongoing and/or historic sources of contamination, the types of contaminants and affected media, any existing and potential exposure pathways, and the known or potential human and ecological receptors that may be threatened by contaminant releases. Furthermore, the CSM supports EPA's guidance for an iterative approach in that it *"can provide the project team with a simple understanding of the site based on available data. Information gaps may be discovered in development of the CSM that support collection of new data."* (EPA, 2002; EPA, 2005) Such iterations are particularly important for the Gowanus Canal in light of its long contaminant history as well as site-specific physical processes and mechanisms that have been discerned. Finally, a CSM assists EPA in selecting a site-specific remedy since there are no presumptive remedies for contaminated sediment hazardous waste sites.

For these reasons, the City recommends that EPA develop a CSM that preliminarily identifies ongoing and past upland industrial sources of contamination in order to guide the decision-making process, the iterative nature of the RI and in selecting a site-specific remedy that addresses all upland discharges of hazardous waste and petroleum to the Canal in order stop current discharge and prevent future recontamination.

2. REVIEW OF POTENTIAL ONGOING CONTAMINATION SOURCES FROM UPLAND INDUSTRIAL PROPERTIES

2.1. SOURCES AND DISTRIBUTION OF CONTAMINATION IN UPLAND AREAS

The City's review of available historical Sanborn Fire Insurance Maps has indicated that heavy industrial and manufacturing activities, including MGPs, coal yards, cement makers, soap makers, tanneries, paint and ink factories, machine shops, chemical plants and oil refineries have been present in the immediate upland vicinity of the Canal, as well as farther upland areas, since the late 1800s. With no environmental regulations in place during the origin and period of peak industrial activity on the Gowanus Canal, it was common practice for industrial facilities to intentionally dispose of their generated wastes on-site as well as directly into the Canal. Further, procedures for transport and storage of raw materials (chemicals, petroleum, etc.) and wastes were not attentive to modern procedures for spill prevention, management or cleanup, and spills and other unintended discharges can be considered to have been routine on these industrial properties.

Several specific upland sources of contamination have already been identified in the vicinity of the Gowanus Canal by governmental regulatory agencies. Complete descriptions of sites in the vicinity of the Gowanus Canal already identified by governmental regulatory programs are described in sections 4.1.1 through 4.1.4 of this document. For example, it is known that three MGPs along the Canal generated coal tar, a dense non-aqueous phase liquid, and purifier waste, which contains cyanide compounds, and that these wastes were disposed on land near the Gowanus Canal. These waste products have since migrated throughout the area of the lower watershed underlying the Canal, thus contaminating soil, groundwater, surface water and sediment in the Canal.

In addition, the City conducted a comprehensive review of historical and modern maps and reports and identified several dozens other upland properties with either a known or a high potential for ongoing discharges of hazardous waste and/or petroleum to the Canal. Individual profiles of these identified upland industrial properties are described further in section 4.1.5 of this document. The City notes that many of these potential upland industrial sources of contamination are at present, largely uncharacterized, as is the distribution of contaminants in soils, surface water and groundwater. These uncharacterized properties and contaminants threaten the long-term effectiveness of any proposed remedy through the risk of recontamination.

2.1.1 Unregulated High Priority Upland Industrial Properties

To establish a basis for an environmental investigation of properties with potential ongoing discharges to the Canal, the City evaluated past land usage for more than 1,300 upland properties in the vicinity of the Gowanus Canal. Following this initial review, approximately 100 industrial properties were selected for detailed evaluation. This review considered numerous factors to evaluate the likelihood of potential ongoing discharge of contaminants to the Canal, and the likelihood of discharge of specific contaminants deemed central to remedial decision-making for Canal sediments. Following this review, 26 high priority industrial properties were identified for further study in the Canal watershed. Each of these properties were evaluated by compilation and detailed review of historical Sanborn fire insurance maps to identify historical features of environmental concern, including evidence of generation, storage (such as tanks), processing, transport or disposal of hazardous waste, hazardous substances, petroleum products, and other wastes. Figure 9 shows the locations of the following 26 high priority upland industrial properties:

Site No.	Site Name	Address
1	Adams Fuel Corp./Adams Petroleum Corp.	38 2nd Avenue
2	American Agricultural Chemical Co./DuPont	217 Huntington Street
3	American Can/Rio Tinto	232-250 3rd St.
4	Argus Chemical Corp./Witco Chemical Corp./Chemtura Corporation	706 Court Street
5	Barrett Company/Allied Chemical & Dye/Honeywell	592-608, 610-628, and 627-641 Smith Street
6	Burns Brothers/Rapid American	267-285 Bond Street
7	Burns Brothers Inc. Coal Yard	148 Third Street
8	Cirillo Brothers Coal & Fuel Corp./Cibro Petroleum	537 Smith Street
9	Consolidated Edison Third Avenue Yard	222 First Street
10	Debevoise Co./Seagrave Coatings Co.	74 20th Street
11	Devoe & Reynolds Inc. Paint Works	381 Smith Street
12	Greason Son & Dazell Inc. /Pittson Co.	150-154 3rd Street
13	Howard Fuel Corp.	107 6th Street
14	Ira S. Bushey & Sons/Amerada Hess Corporation	764 Court Street
15	Koppers Company/Beazer Materials	300-326 Nevins Street
16	Mobil Service Station/Exxon Mobil	375 Hamilton Avenue
17	New York Tartar/Standard Brands/Nabisco/Stauffer Chemical/Chesbrough/Unilever Ltd.	59 9th Street
18	Pure Oil Co./ Preferred Oil Co. /Unocal/Chervon Texaco	400 Carroll Street
19	Pure Oil Co./Unocal/Chervon Texaco	150-154 3rd Street

Site No.	Site Name	Address
20	Pure Oil Co./Unocal/Chervon Texaco	200-210 3rd Street
21	Standard Oil Co./Vesta Oil Works/Exxon Mobil	365 Bond Street
22	Supreme Oil Terminal/Bayside Fuel Oil Depot Corp.	510 Sackett Street
23	Texas Company/Chervon Texaco	744 Clinton Street
24	Thompson & Co. Coal Yard/Donald & Co. Oil Storage	503 Smith Street
25	Thos Paulson & Son, Inc.	307-325 Bond Street
26	Vidan Auto Salvage	327 Bond Street

Groundwater monitoring wells and soil borings have been proposed at specific locations on each of the 26 high priority upland industrial properties using the following general criteria: bias toward potential contaminant source areas; bias toward the downgradient property boundary, between the property and the Canal (or along the Canal where the property is adjacent), to identify active discharges to the Canal; and along the upgradient property boundary to identify upgradient impacts to water quality entering the property.

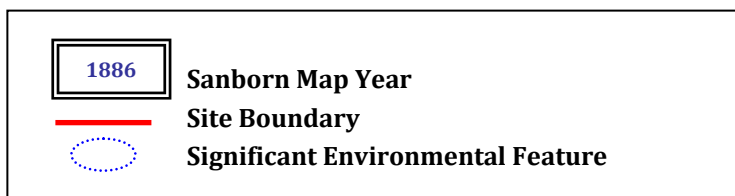
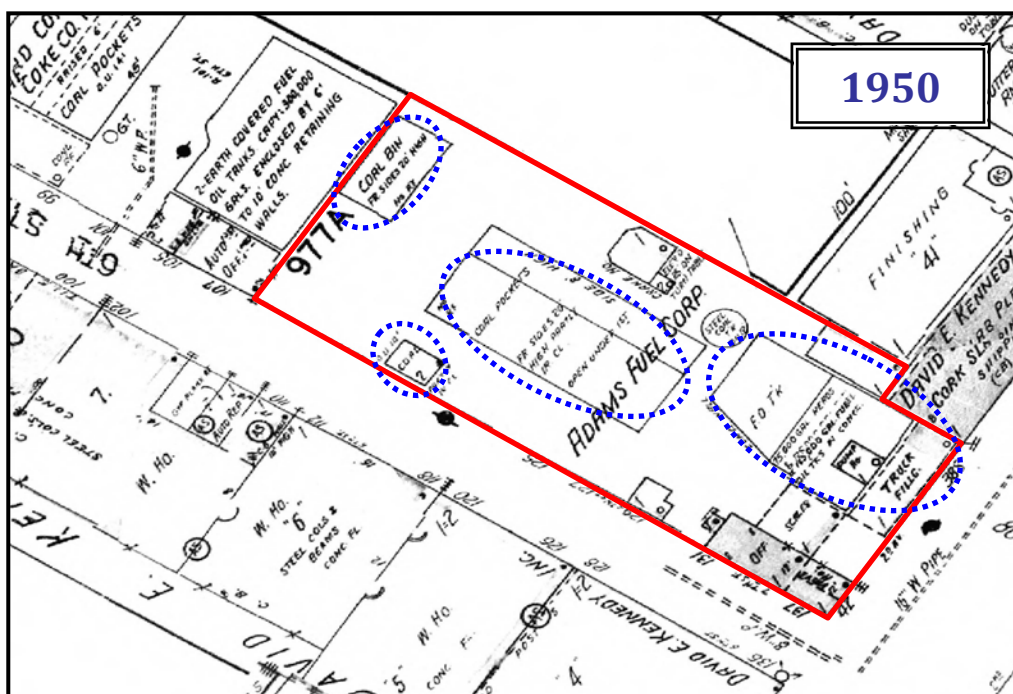
Individual property summary sheets including pertinent information derived from the historical map review, the associated potential environmental concern related to each past and current industrial use, two samples of historical maps showing significant environmental features of concern, and a figure showing the proposed soil boring and monitoring well locations are presented below. These 26 properties are not intended to represent all potential industrial properties with potential for ongoing discharge to the Canal, but do illustrate the caliber of former industrial properties that are present in the vicinity of the Canal that warrant inclusion in a CSM and upland RI by EPA under CERCLA.

**Site No. 1 - Adams Fuel Corp./Adams Petroleum Corp.
38 2nd Avenue**

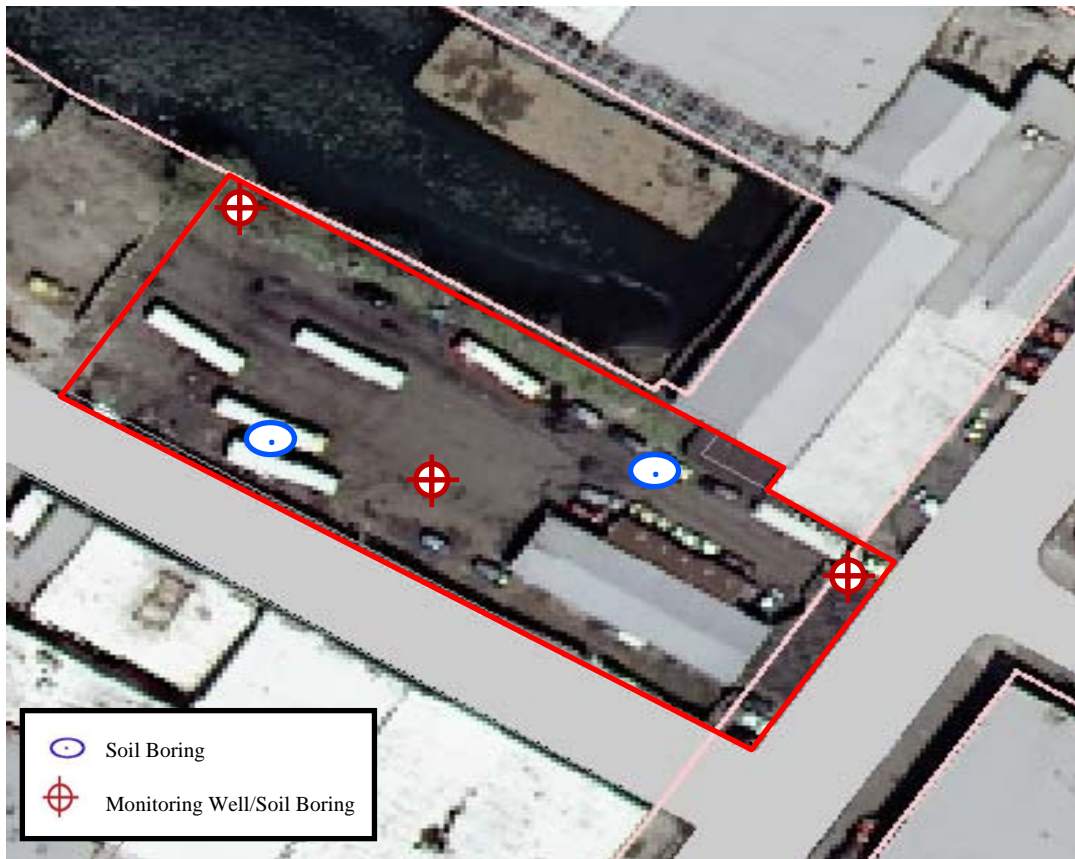
**Sanborn Fire Insurance Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Arnois & Lecour Chemical Works Ammoniacal Products: five gas liquor tanks, two carbonic acid gas tanks, one ammonia gas tank, and four converters.	A significant amount of acidic products and gas liquor was stored and handled at this former chemical manufacturing plant.
1904	Uvalde Asphalt Paving Co., blacksmith shop.	Petroleum products were used and stored at this former asphalt paving company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	Dale Coal & Coke Corp.: coal pockets and bins.	Petroleum products and coal were used and stored at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Adams Fuel Corp: Coal bins and pockets; one 75,000-gallon kerosene tank and one 75,000-gallon fuel oil tank both in concrete; pump house; truck filling station.	A large amount of fuel oil, kerosene, and coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	Adams Petroleum Corporation: Three 30,000-gallon fuel oil tanks in concrete, earth covered kerosene & fuel oil tanks enclosed by concrete walls, truck filling station.	A large amount of fuel oil, kerosene, and coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

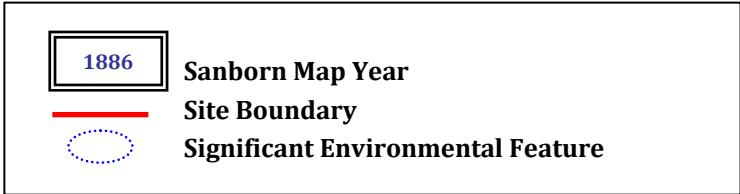
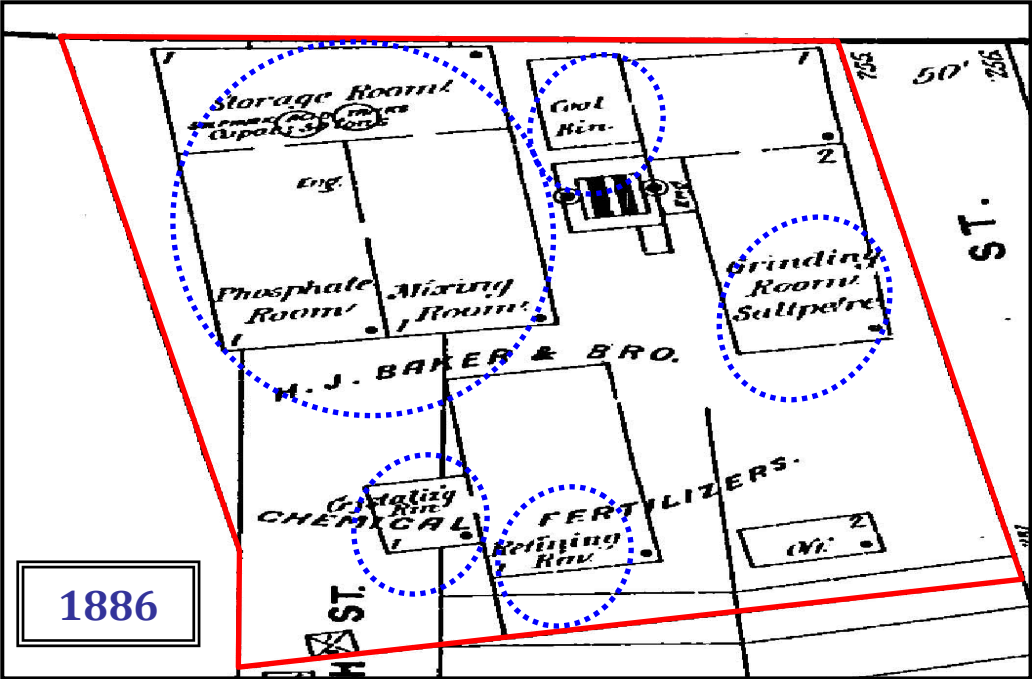


**Site No. 2 - American Agricultural Chemical Co./DuPont
217 Huntington Street**

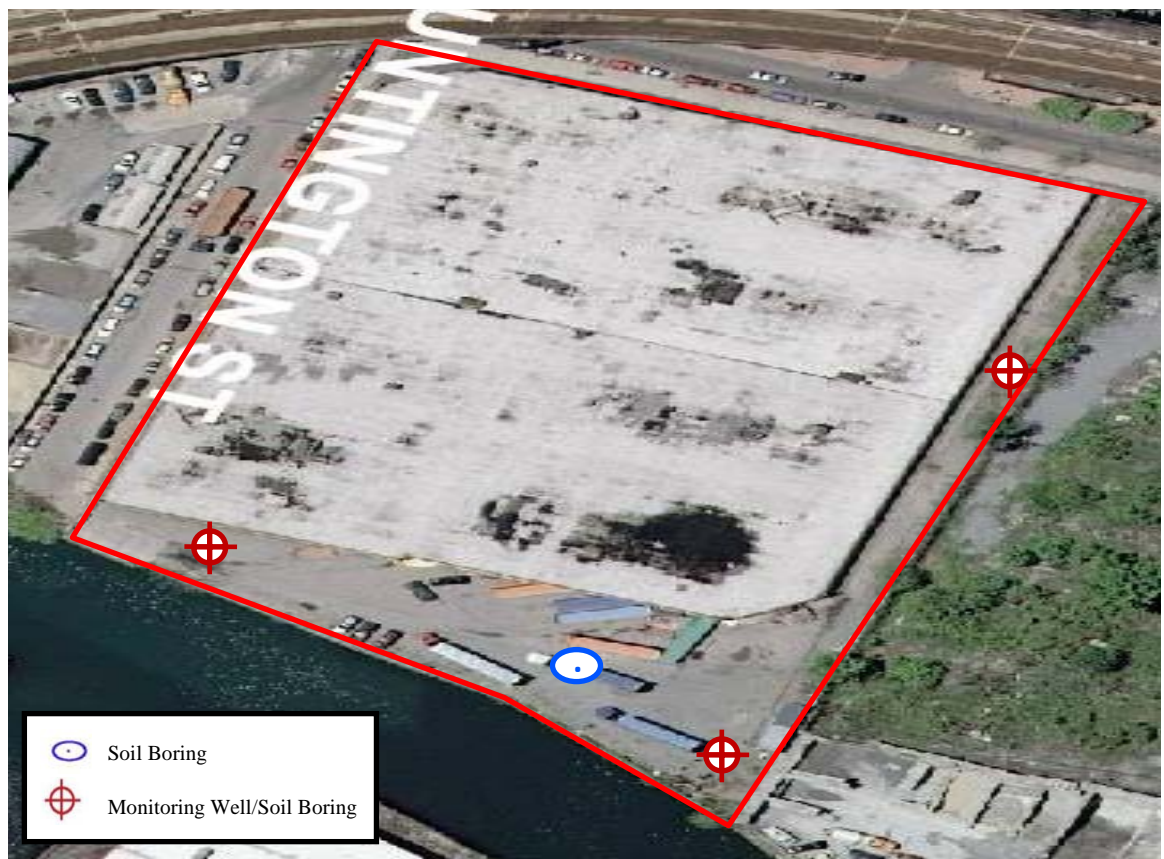
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	H.J. Baker & Bro. Chemical Fertilizers – storage room with two sulphuric acid tanks; phosphate room; mixing room; grinding room; saltpetre; crystallizing room; refining room; coal bin.	A large amount of chemical and petroleum products and solvents was produced and stored at this former fertilizer manufacturing facility. Potential contaminants include metals, such as zinc, copper, lead, manganese, nickel, chromium, cadmium, and cobalt compounds; nitrate compounds; ethylene glycol; methyl isobutyl ketone; methanol; formaldehyde; and acids.
1904	American Agricultural Chemical Co., chemical fertilizers – storage, mixing, grinding, two sulphuric acid tanks.	A large amount of chemical and petroleum products and solvents was produced and stored at this former fertilizer manufacturing facility. Potential contaminants include metals, such as zinc, copper, lead, manganese, nickel, chromium, cadmium, and cobalt compounds; nitrate compounds; ethylene glycol; methyl isobutyl ketone; methanol; formaldehyde; and acids.
1938-1969	Primarily vacant. Appears that operations of Brooklyn Union Gas Citizens Works may extend onto northeastern portion of the site – storage tank, steel separator tanks.	Coal tar and petroleum products were produced and stored at the former Brooklyn Union Gas Citizen Works. Potential contaminants include: benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1977-1980	Antarenni Industries Inc., manufacturers of wrought iron furniture.	Various petroleum products, solvents, paint, and heavy metals could be stored and used at the former iron furniture manufacturer. Potential contaminants include metals, various chlorinated and organic solvents.
1981-1991	Vitamasters Industries Inc. – manufacturing operation identified on Sanborn map.	While the type of manufacturing activities cannot be identified from Sanborn map review, any mishandling of any chemical or petroleum products could impact the subsurface environment and the Canal.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

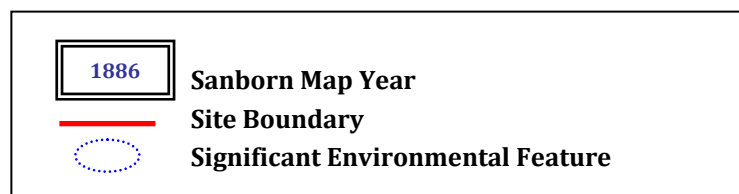
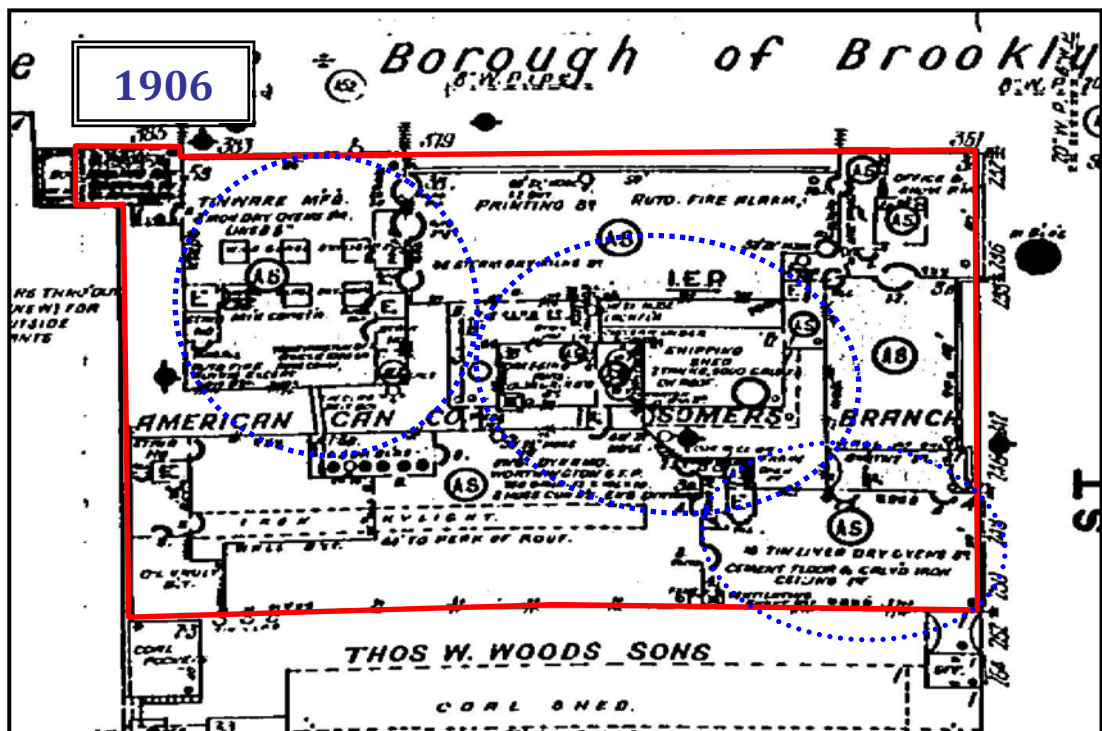
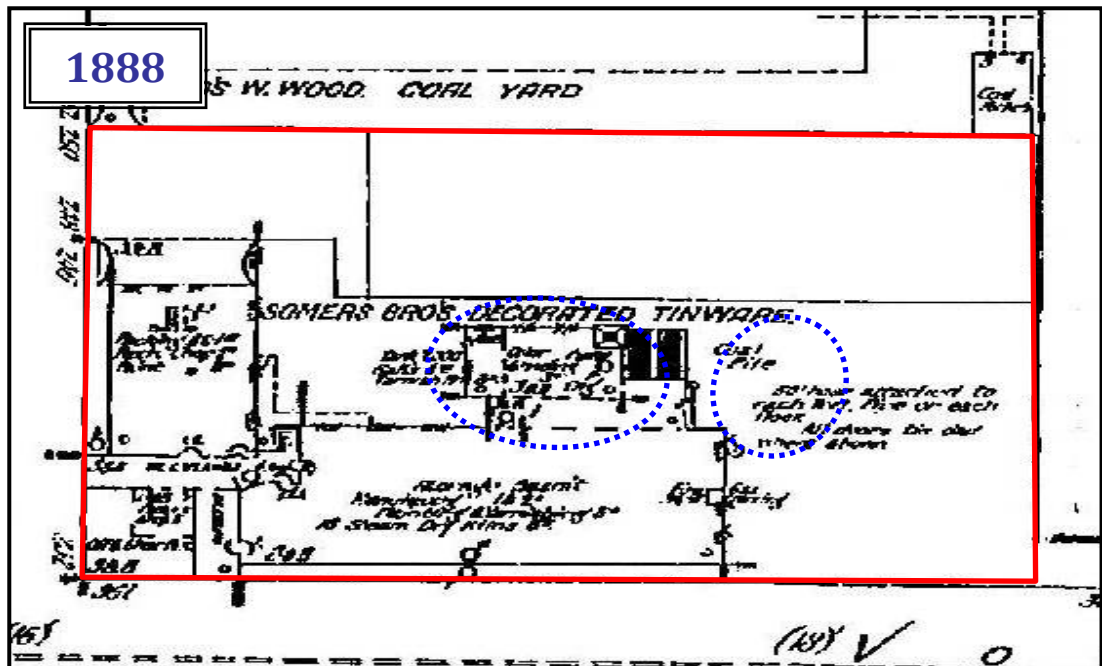


**Site No. 3 - American Can/Rio Tinto
232-250 3rd St.**

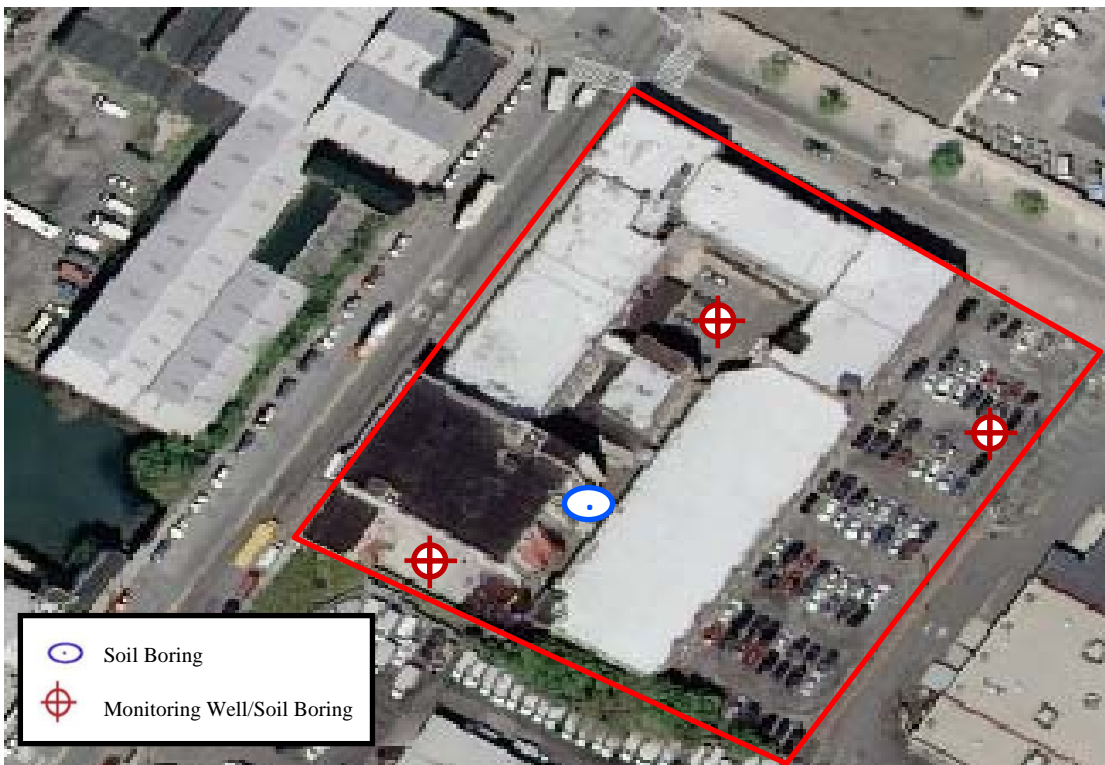
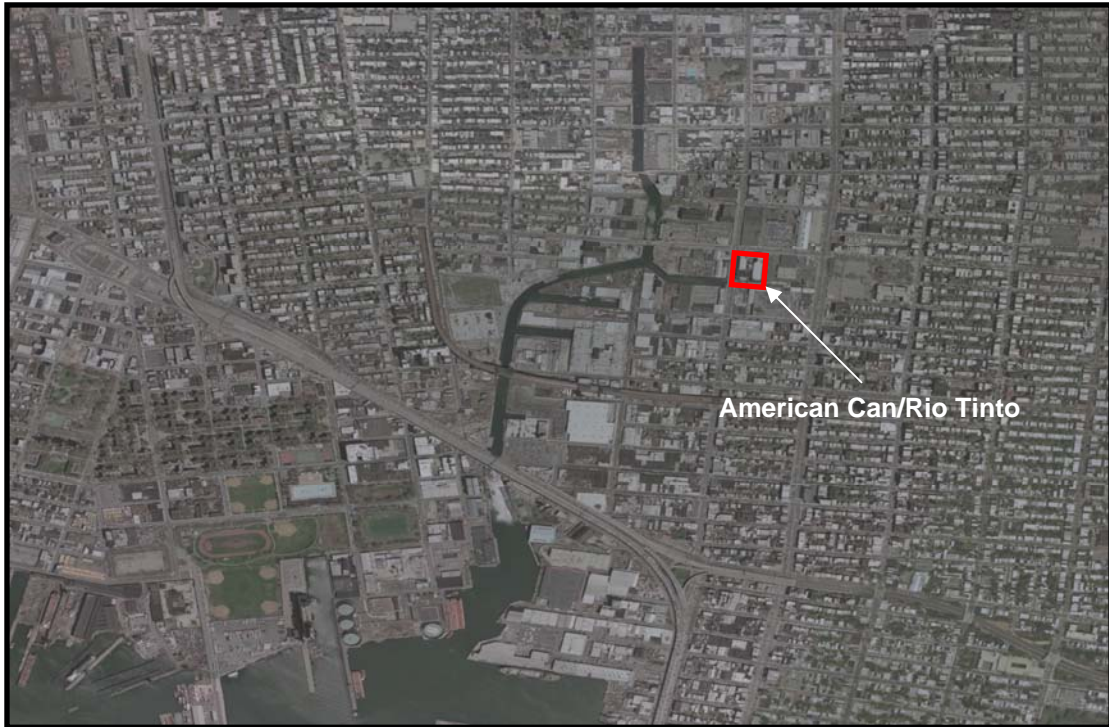
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1888	Somers Bros. Decorated Tinware	Various petroleum products, solvents, paint, and heavy metals could be stored and used at the former iron furniture manufacturer. Potential contaminants include metal compounds (tin, copper, lead, zinc, etc.), cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1906	American Can Company, Somers Branch – tinware manufacturing; painting; shipping; offices.	Various petroleum products, solvents, paint, and heavy metals could be stored and used at the former iron furniture manufacturer. Potential contaminants include metal compounds (tin, copper, lead, zinc, etc.), cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1951	Owners – American Can. Metropolitan Ware House – lofts; storage; boiler room; drying ovens.	Various petroleum products, solvents, paint, and heavy metals could be stored and used at the former iron furniture manufacturer. Potential contaminants include metal compounds (tin, copper, lead, zinc, etc.), cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

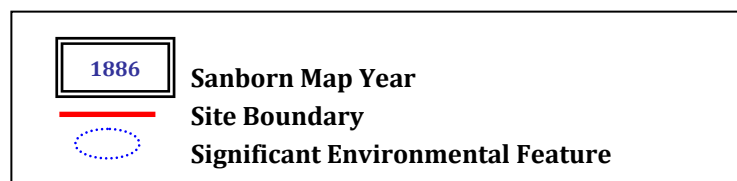
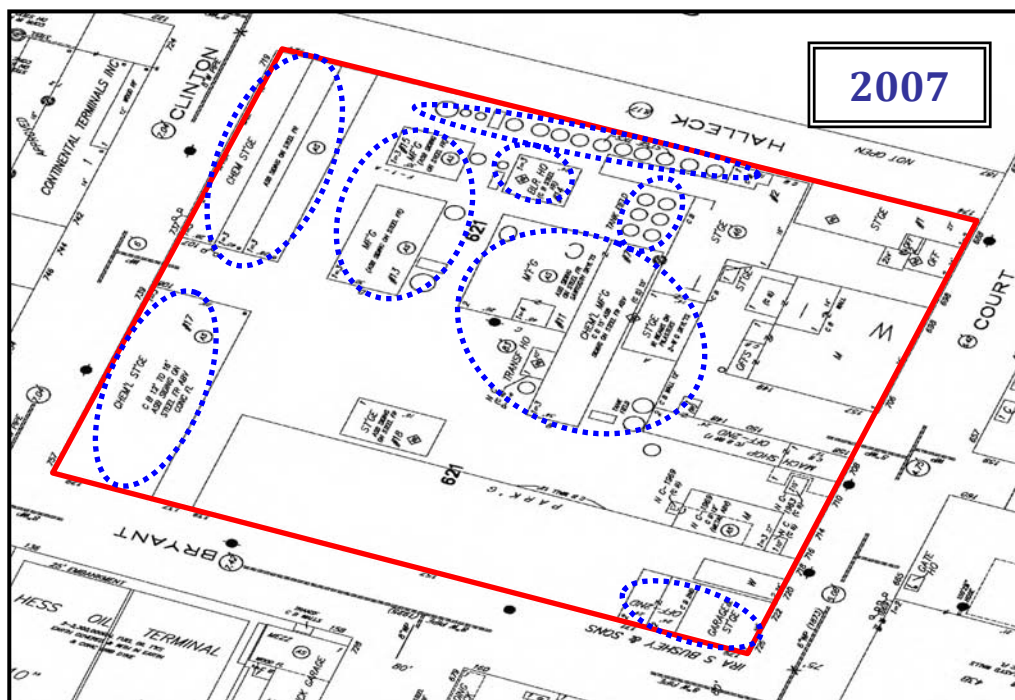
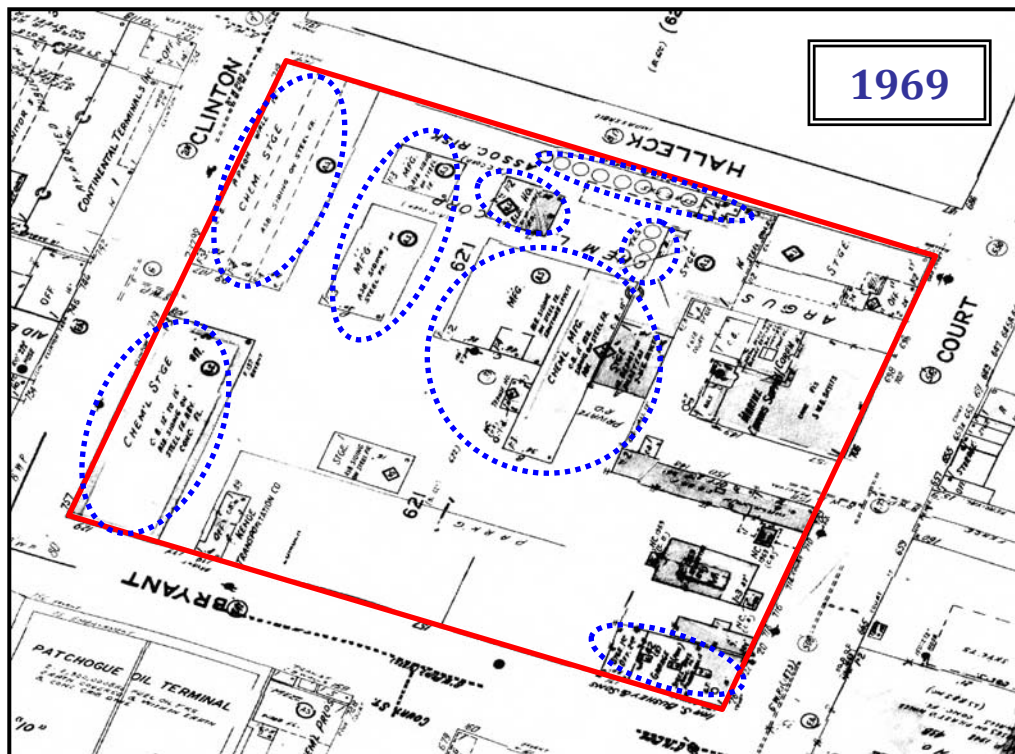


**Site No. 4 - Argus Chemical Corp./Witco Chemical Corp./
Chemtura Corporation
706 Court Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1904	Milliken Bros. Iron Works, railroad spur, travelling cranes.	Various petroleum products and solvents were probably stored and used at the former iron works. Potential contaminants include metal compounds, cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1915	Blacksmith	The petroleum products and solvents were likely used at the blacksmith. Potential contaminants include metal compounds, cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1938-1950	The Howland Mutual Lumber Co. Inc.; two garages with one gasoline tank each; Marine Canvas Supply Corporation; John F. McKenna Inc. Lumber Yard. John Manton boiler maker, blacksmith.	Various petroleum products, solvents, and gasoline could be stored and used during these former industrial operations. Potential contaminants include metal compounds, cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1969-1993	Argus Chemical Corporation: chemical manufacturing and storage buildings, tanks, garages; Kenge Transportation Co.	A significant amount of chemical and petroleum products were likely stored and handled at this former chemical manufacturing plant. Potential contaminants include: metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.
1995-2007	Witco: chemical manufacturing and storage buildings, tanks, garages, boiler house, transformer house, machine shop.	A significant amount of chemical and petroleum products were likely stored and handled at this former chemical manufacturing plant. Potential contaminants include: metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



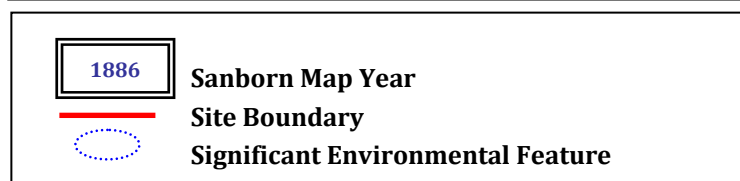
**Site No. 5 - Barrett Company, Allied Chemical & Dye/Honeywell
592-608, 610-628, and 627-641 Smith Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Iron drain pipe storage; ship yard. Vacant/residential.	Petroleum products, solvents, and paint were probably stored and handled from boat building and painting activities at the property.
1904	627-641 Smith St - Barrett Manufacturing Company – tar tank (4467 barrels capacity), tar tank (5574 barrels capacity), two smaller tanks, two oil tanks, office, tool room, storage and shipping shed, open dock shed. 610-628 Smith St - Barrett Manufacturing Company – mill construction coal tar products, storage, machine shop, mixers, garage, coal shed, refoil house. 592-608 Smith Street – Barrett Manufacturing Co. Storage Shed	A large amount of coal tar and petroleum products was produced and stored at this former manufacturing facility. In addition, solvents and chemical products were likely used in the operation. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	627-641 Smith St - Barrett Manufacturing Company – 9 tar tanks, office, storage and shipping shed. 610-628 Smith St - Barrett Manufacturing Company Tar Felt Paper – mill construction, coating, pitch shed. 592-608 Smith Street – Barrett Manufacturing NY Roofing Co.	A large amount of coal tar and petroleum products was produced and stored at this former manufacturing facility. In addition, solvents and chemical products were likely used in the operation. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	627-641 Smith St - Barrett Company – vacant. 610-628 Smith St - Barrett Company Tar Felt Paper – mill construction, storage, shed. 592-608 Smith Street - Bowne-Morton Stores Warehouse.	A large amount of coal tar and petroleum products was produced and stored at this former manufacturing facility. In addition, solvents and chemical products were likely used in the operation. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	627-641 Smith St - Colonial Stone & Sand Co. Inc. – concrete mixing, machinery, two gasoline tanks. 610-628 Smith St – W. T. Howald, machine designer – machine shop. 592-608 Smith Street - Bowne-Morton Stores Warehouse.	Various petroleum products, solvents, and heavy metals could be stored and used at the former foundry and machine shop.
1969	627-641 Smith St – Black Diamond Line – cargo storage and cargo handling. 610-628 Smith St - W. T. Howald, machine designer – machine shop; factory; Argus Chemical Corp., metallic soap manufacturing. 592-608 Smith Street – Marra Bros. Inc. Warehouse.	Various petroleum products, solvents, and heavy metals could be stored and used at the former machine shop. In addition, a large amount of chemical products was manufactured at the former chemical company.
1977-1982	627-641 Smith St – Pittston Stevedoring – cargo storage and cargo handling. 610-628 Smith St - W. T. Howald, machine designer – machine shop; factory; Argus Chemical Corp., metallic soap manufacturing. 592-608 Smith Street - Pittston Stevedoring warehouse.	Various petroleum products, solvents, and heavy metals could be stored and used at the former machine shop. In addition, a large amount of chemical products was manufactured at the former chemical company.
1986-1988	627-641 Smith St – Bridgeston – cargo storage and cargo handling. 610-628 Smith St - W. T. Howald, machine designer – machine shop; factory; Argus Chemical Corp., metallic soap manufacturing 592-608 Smith Street - Pittston Stevedoring warehouse.	Various petroleum products, solvents, and heavy metals could be stored and used at the former machine shop. In addition, a large amount of chemical products was manufactured at the former chemical company.
1991-1996	627-641 Smith St – Bridgeston – cargo storage and cargo handling. 610-628 Smith St - W. T. Howald, machine designer – machine shop; factory; Argus Chemical Corp., metallic soap manufacturing 592-608 Smith Street – ACE Demolition Excavation Inc.	Various petroleum products, solvents, and heavy metals could be stored and used at the former machine shop. In addition, a large amount of chemical products was manufactured at the former chemical company.

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Proposed Well and Boring Locations



**Site No. 6 - Burns Brothers/Rapid American
267-285 Bond Street**

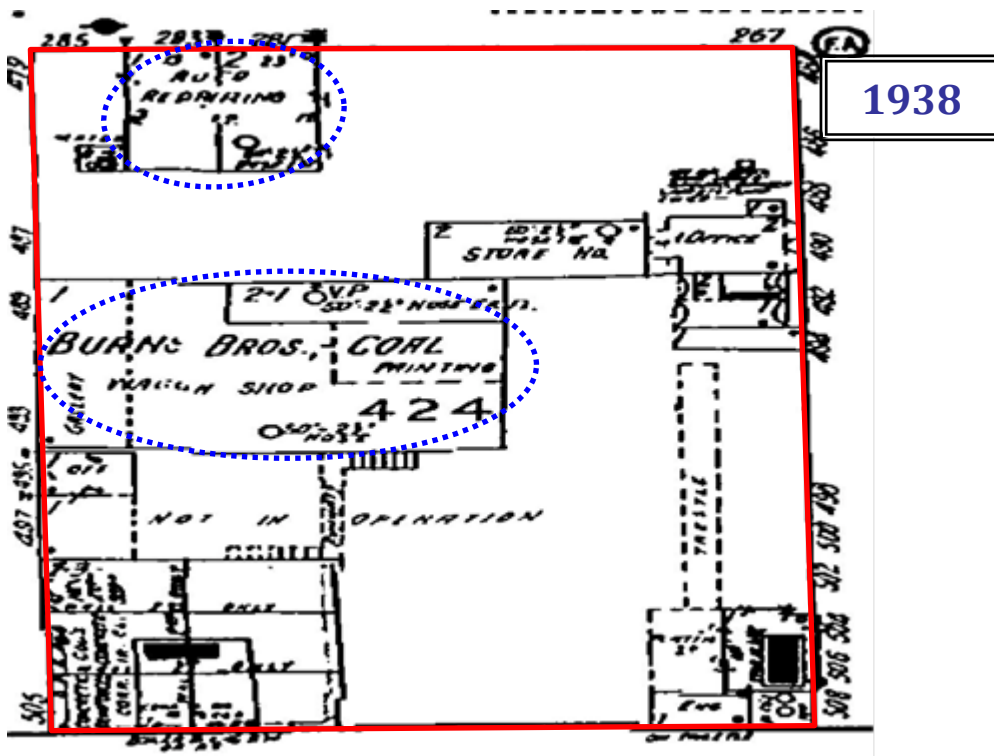
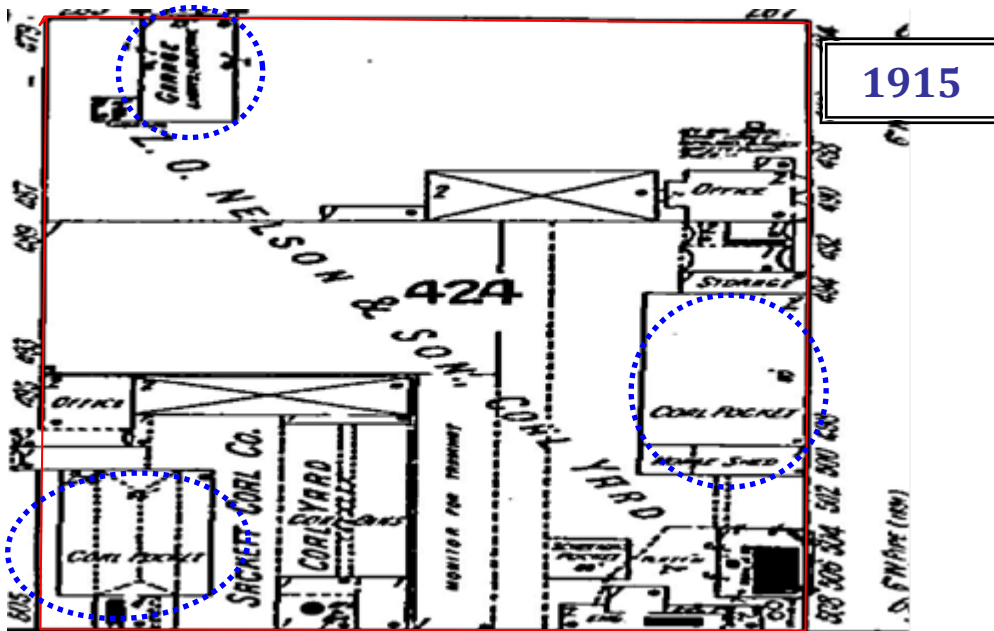
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Vanderbilt's Coal Yard; Z.O. Nelson & Son Coal Yard; Quinn's Coal Yard – coal pockets and coal sheds.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	Z.O. Nelson & Son Coal Yard; Moquin, Offerman, Heisenbuttel Coal Co. – multiple coal pockets and coal sheds.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	Z.O. Nelson & Son Coal Yard; Sackett Coal Co. – multiple coal pockets and coal sheds; garage.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1922-1928	Commonwealth Fuel Co.	A large amount of fuel oil was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	Burns Bros. Coal – wagon shop, auto repair, store house.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

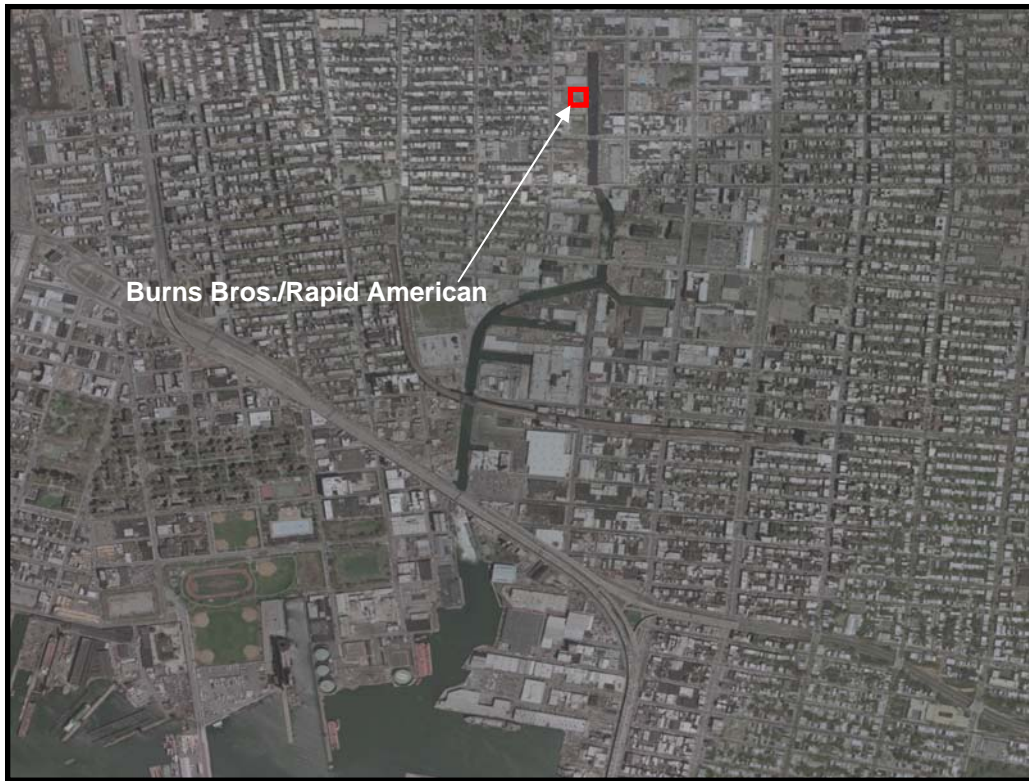
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Stulman Box & Lbr. Co. – wood box manufacturing, coal pockets, lumber piles, storage; gasoline tank.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	Premium Corp. – coal pockets, gasoline tank, office; parking lots; auto repair with gasoline tank.	A large amount of fuel oil was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1977	Premium Corp. – coal pockets, gasoline tank, office; parking lots; New York Telephone Company.	A large amount of fuel oil was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1979-2007	Premium Corp. – coal pockets, gasoline tank, office; parking lots; Ryder Truck Rental.	A large amount of fuel oil was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

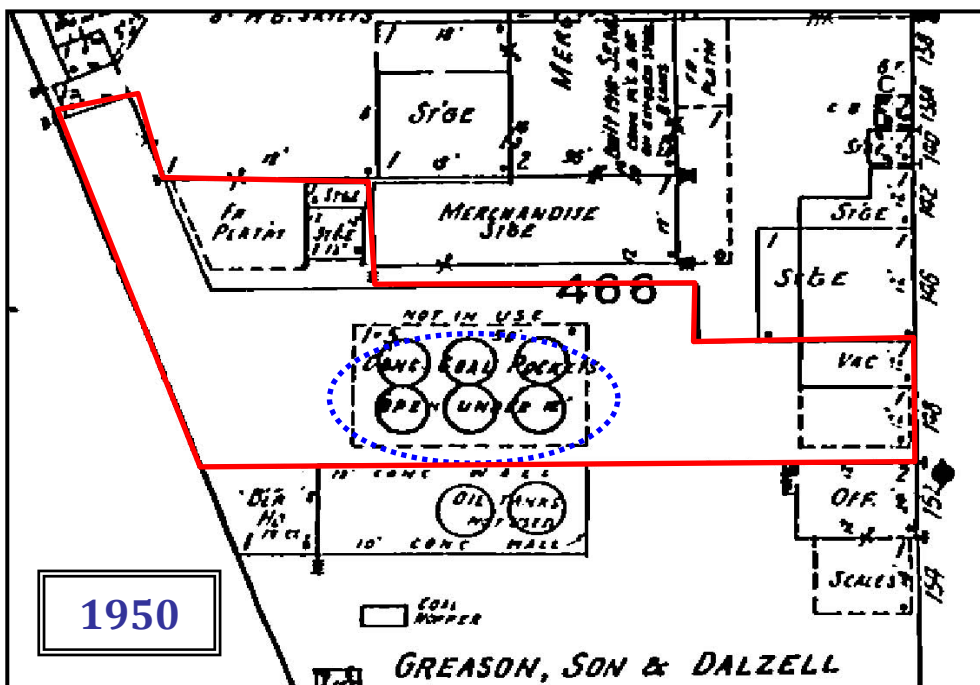
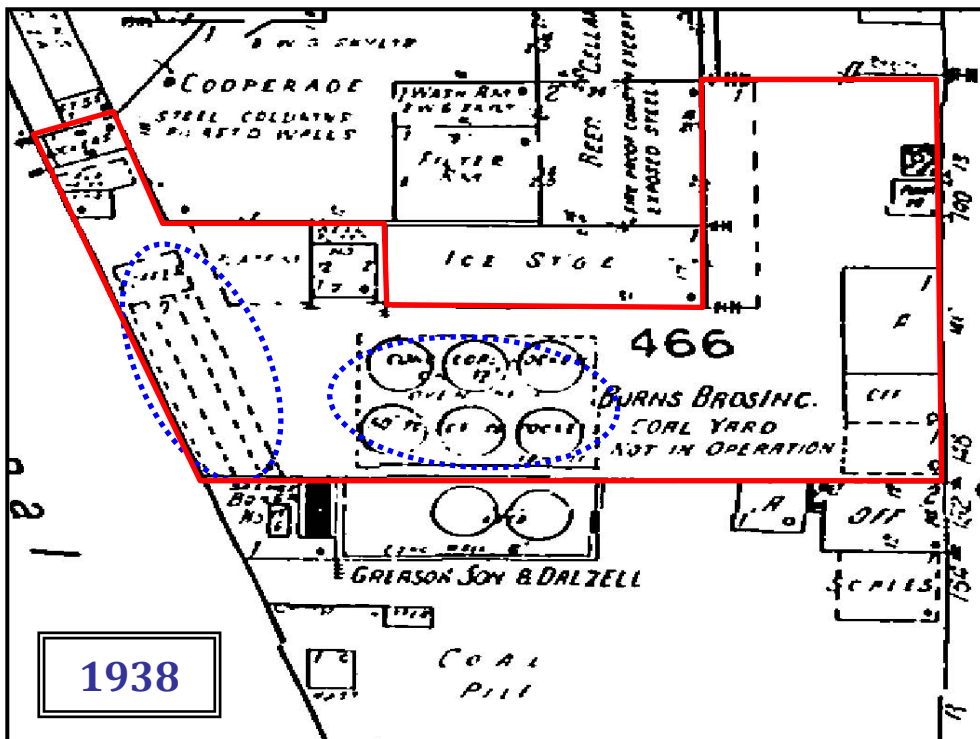


**Site No. 7 - Burns Brothers Inc. Coal Yard
148 Third Street**

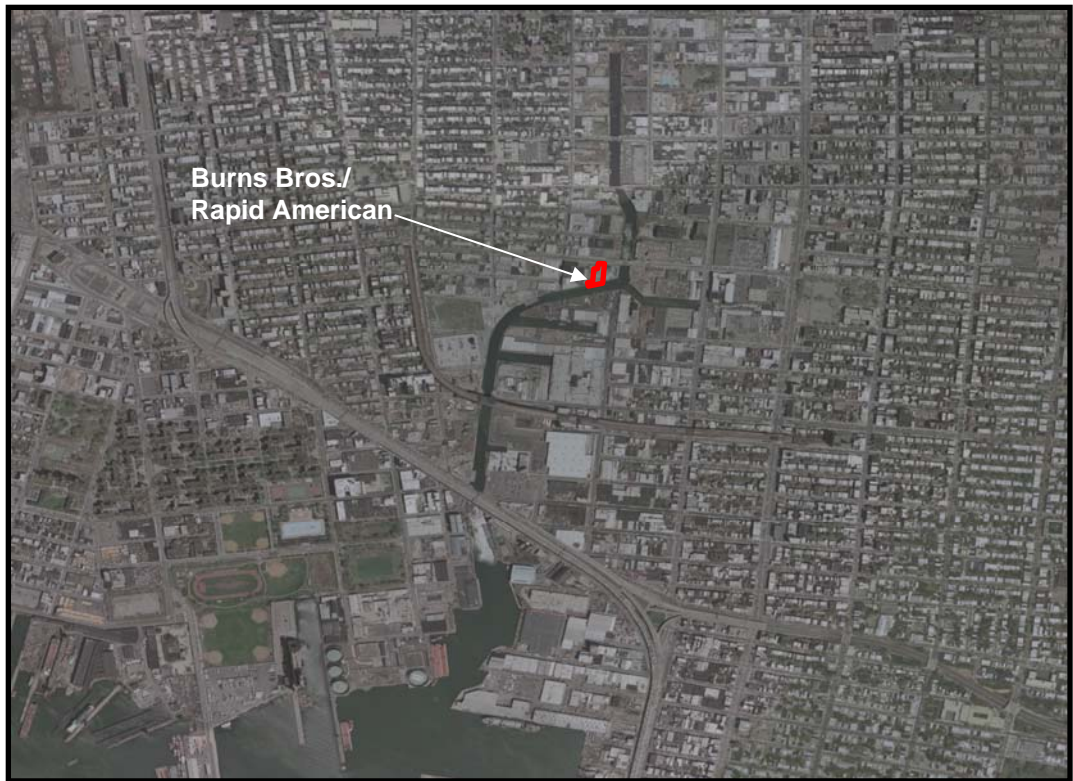
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	A. Lippitt's Planing Mill & Lumber Yard.	Petroleum products and solvents were probably used for the machinery at this former timber yard.
1915-1922	Leonard Michel Brewing Co. – wagon shed, auto house.	Petroleum products and solvents were likely used during auto repair activities.
1928	Leonard Michel Brewing Co.; Rube Coal & Ice – 6 circular structures.	Petroleum products and solvents were likely used during auto repair activities.
1938	Burns Bros. Inc. Coal Yard (Not in Operation). Six concrete coal pockets (corresponding to circular structures noted in 1928 map); office, garage.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Six concrete coal pockets not in use; vacant building.	A large amount of coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

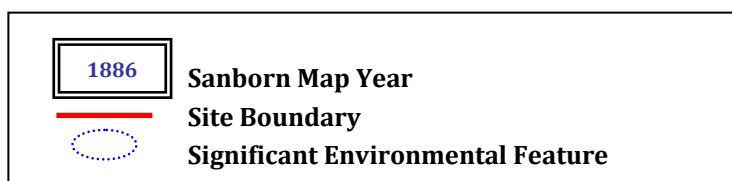
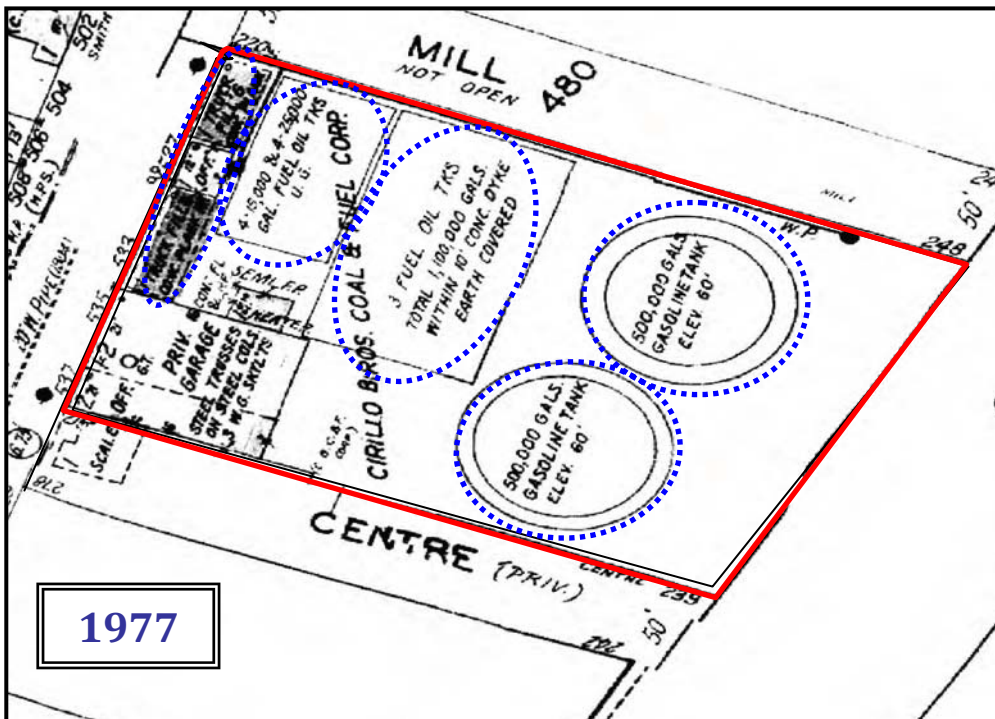
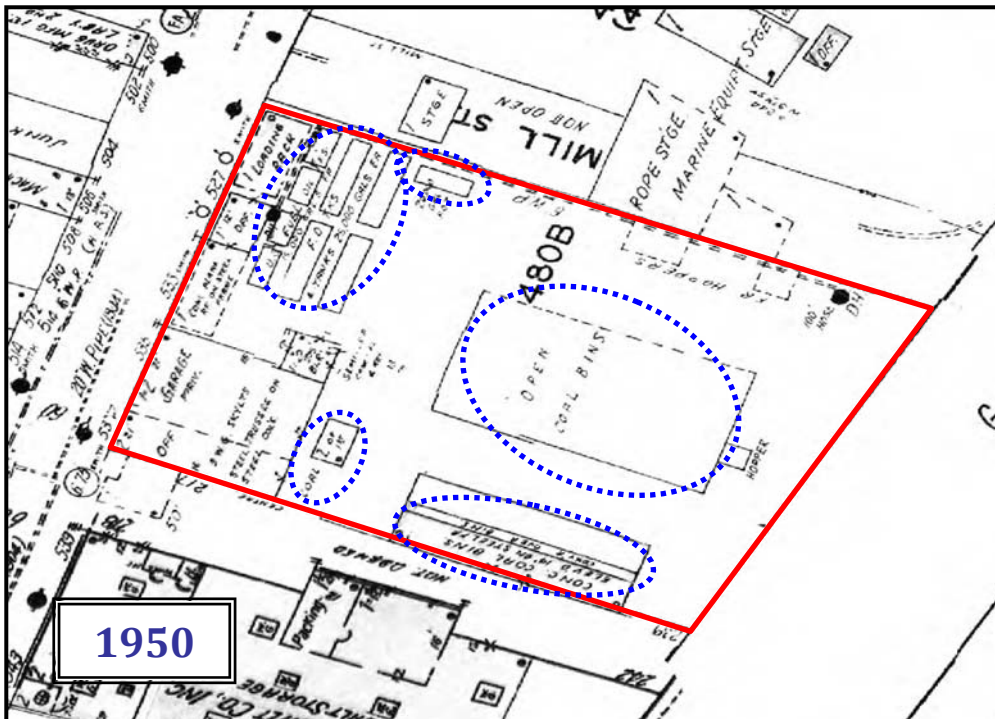


**Site No. 8 - Cirillo Brothers Coal & Fuel Corp./Cibro Petroleum
537 Smith Street**

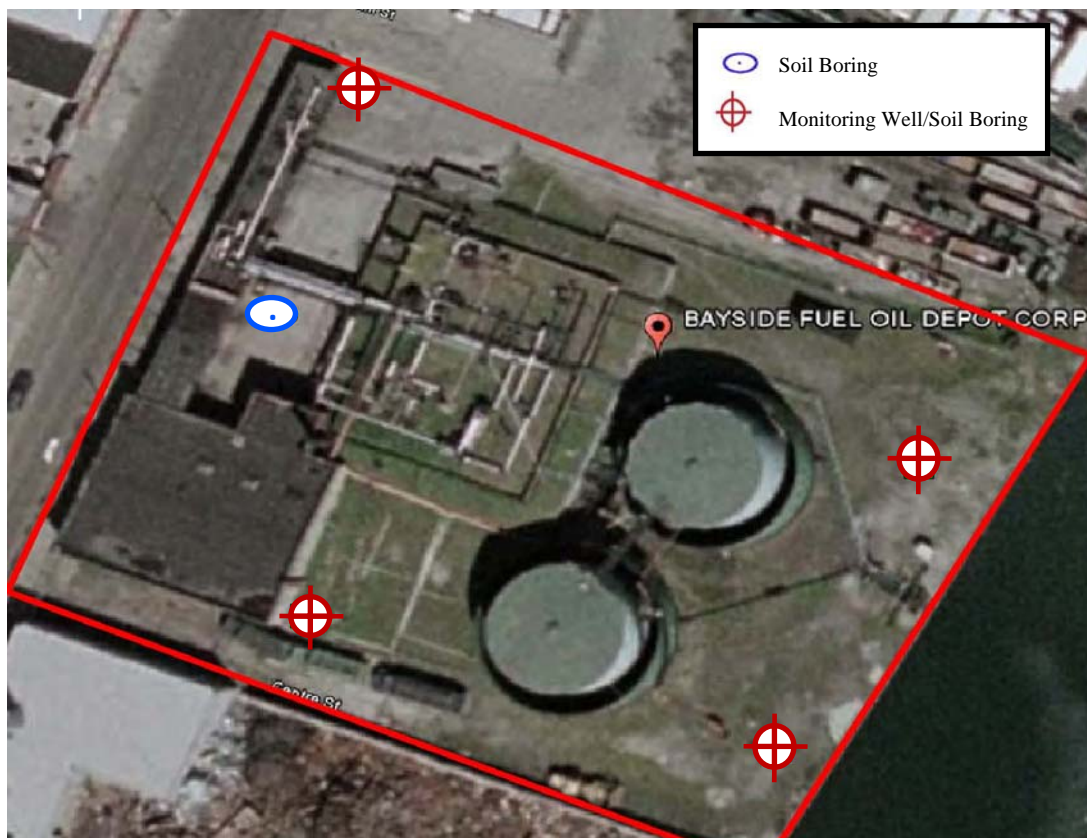
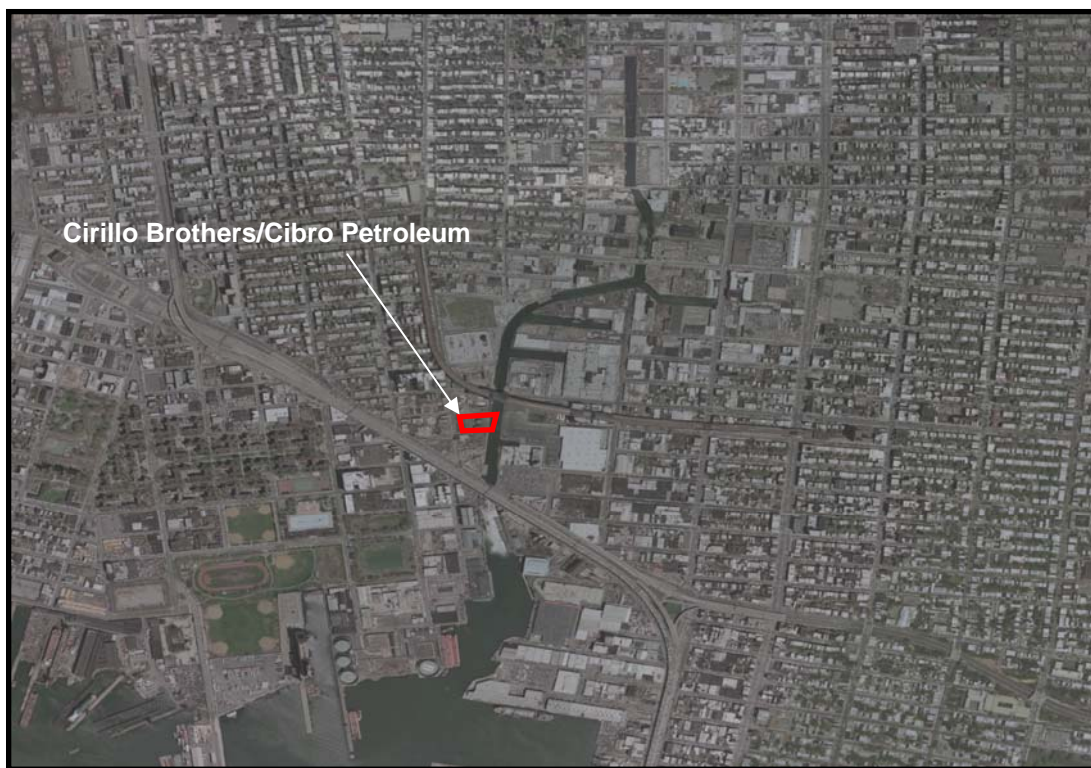
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Haggerty's Glass Works: furnaces, cooling ovens, coal shed, sand bin; Mold & Fire Brick factory.	Based on the types of previous industrial operations at the property, petroleum products and coal were likely stored and handled. Petroleum products and solvents were likely used during auto repair activities.
1938	B. Goetz & Bro Inc. – masons materials; coal bins; coal shed; brick and lime sheds. Motor Freight Depot.	Based on the types of previous industrial operations at the property, petroleum products and coal were likely stored and handled. Petroleum products and solvents were likely used during auto repair activities.
1950	Open coal bins, fuel oil tanks of varying sizes: 15,000-gallons and 25,000-gallons, concrete coal bins, and loading racks.	A large amount of fuel oil and coal were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	Cirillo Brothers Coal & Fuel Corp.: Four 15,000-gallon and four 25,000-gallon fuel oil tanks, all underground; three fuel oil tanks totaling 1,100,000 gallons within 10' concrete dyke – earth covered; private garage with gasoline tank of unidentified capacity.	A large amount of fuel oil and coal were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1977-2007	Cirillo Brothers Coal & Fuel Corp.: Four 15,000-gallon and four 25,000-gallon fuel oil tanks, all underground; three fuel oil tanks totaling 1,100,000 gallons within 10' concrete dyke – earth covered, two 500,000-gallon gasoline tanks – elevated 60'; private garage with gasoline tank of unidentified capacity.	A large amount of fuel oil and coal were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

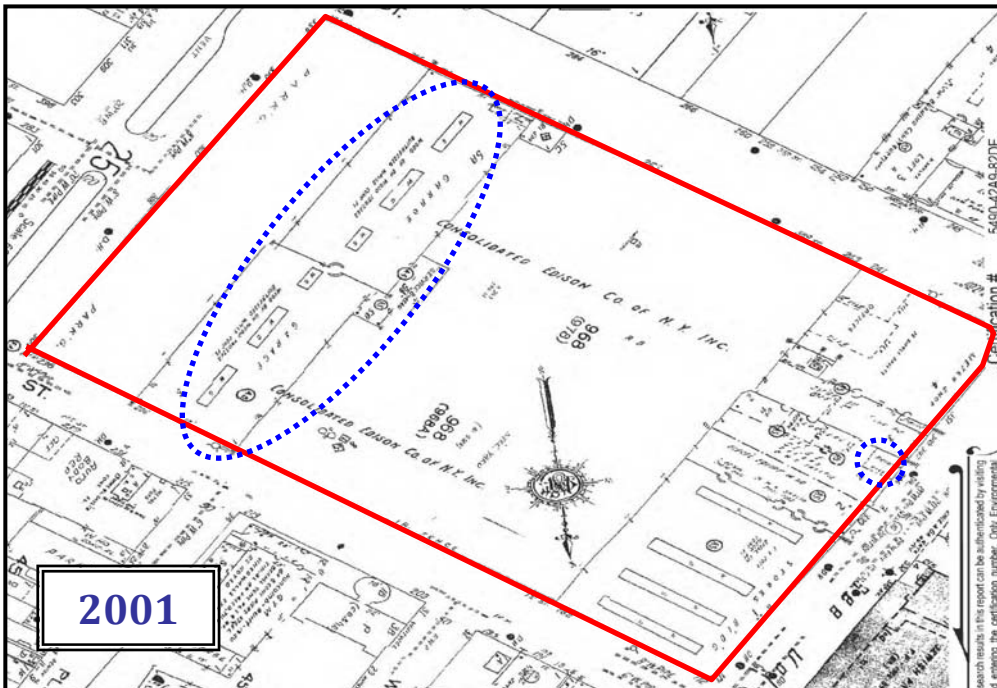
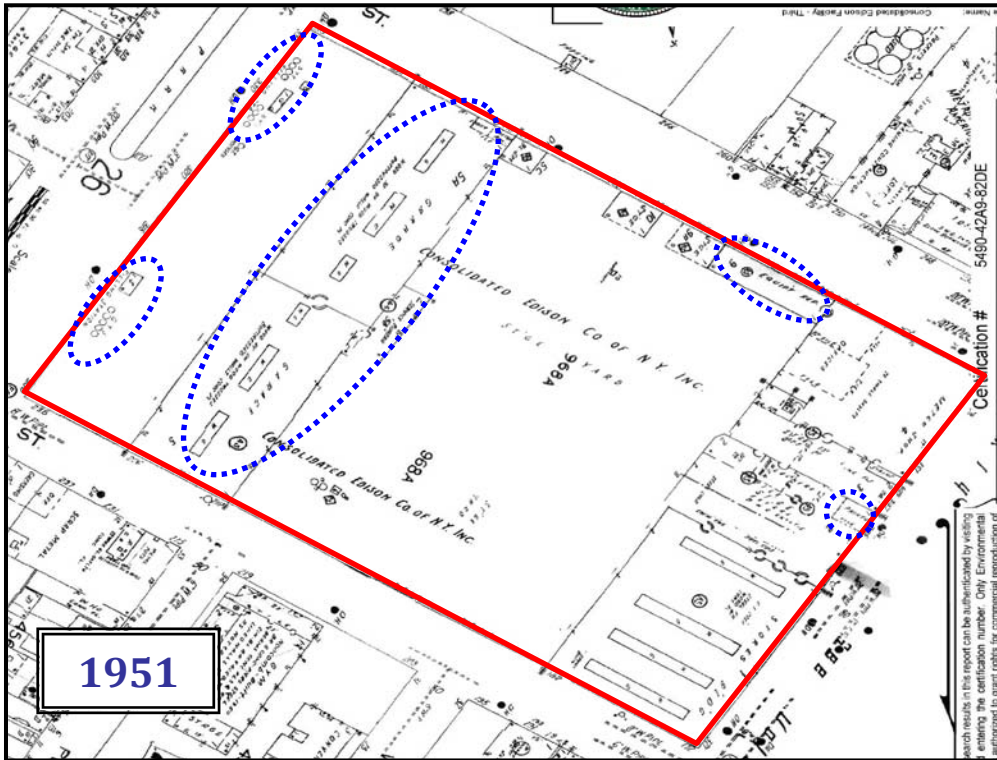


**Site No. 9 - Consolidated Edison Third Avenue Yard
222 First Street**

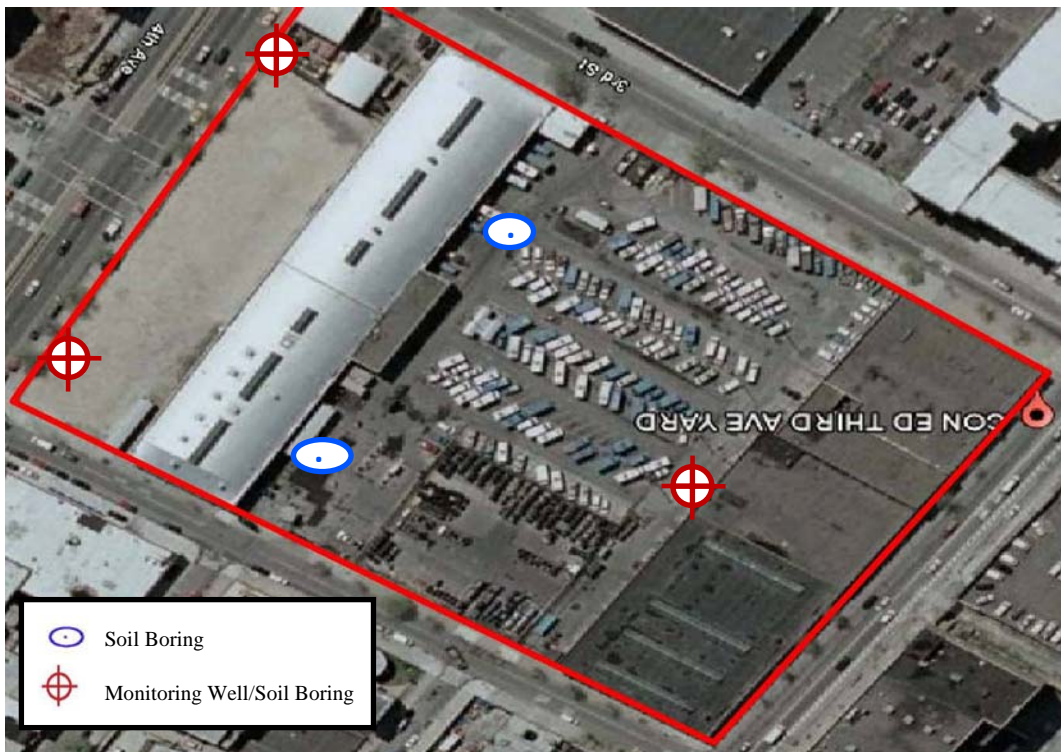
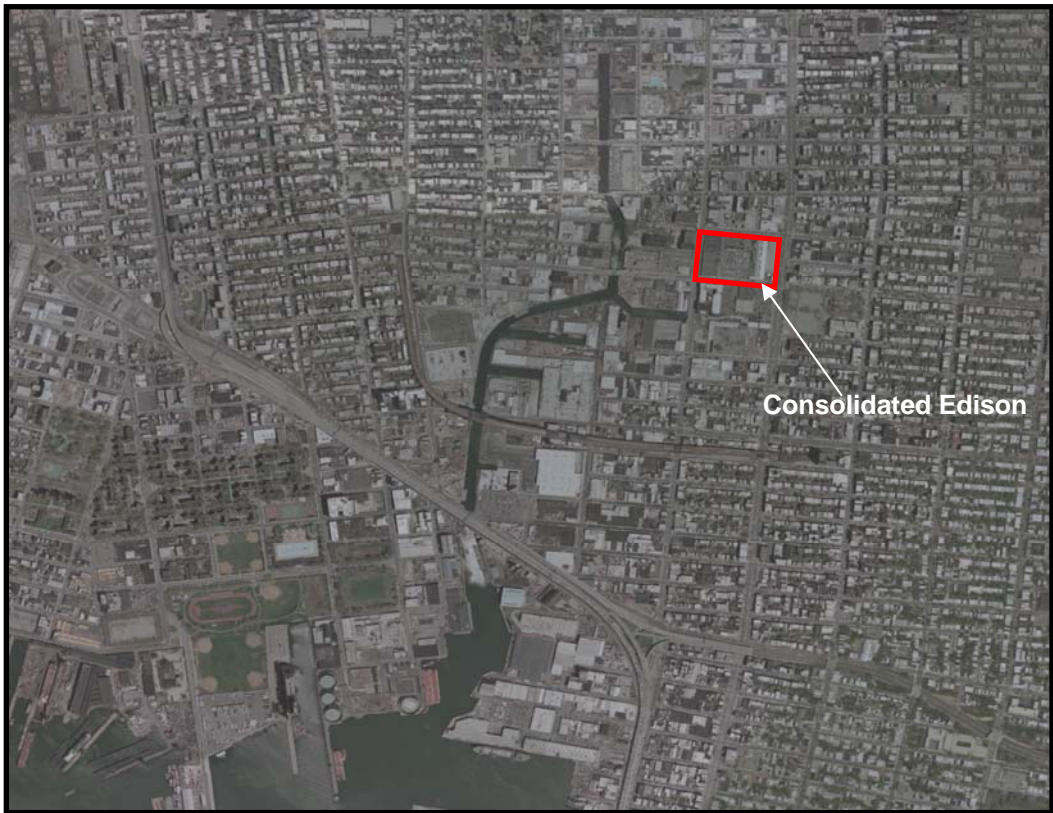
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1926	Washington Park Warehouse Corporation: Now owned by Brooklyn Edison Company. Vacant building and storage. Brooklyn Union Gas Company facility: garages, gasoline tanks, boiler room, filling station with three gasoline tanks.	Petroleum products were stored and handled at this property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1951	Consolidated Edison Co of NY, Inc. Service Bureau: meter shop, offices, storage, lockers, electrical equipment warehouse, stores building, two garages, two sheds, blacksmith, parking lot, equipment repair; two filling stations with a total of 13 gasoline tanks; one unused gasoline tank; two additional gasoline tanks in yard.	A large amount of gasoline was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1965-1988	Consolidated Edison Co of NY, Inc. Service Bureau: meter shop, offices, storage, lockers, electrical equipment warehouse, stores building, two garages, two sheds, blacksmith, parking lots, equipment repair; one unused gasoline tank; two additional gasoline tanks in yard.	A large amount of gasoline was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1991-2007	Consolidated Edison Co of NY, Inc. Service Bureau: meter shop, offices, storage, lockers, electrical equipment warehouse, stores building, two garages, two sheds, blacksmith, parking lots, one unused gasoline tank; two additional gasoline tanks in yard.	A large amount of gasoline was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

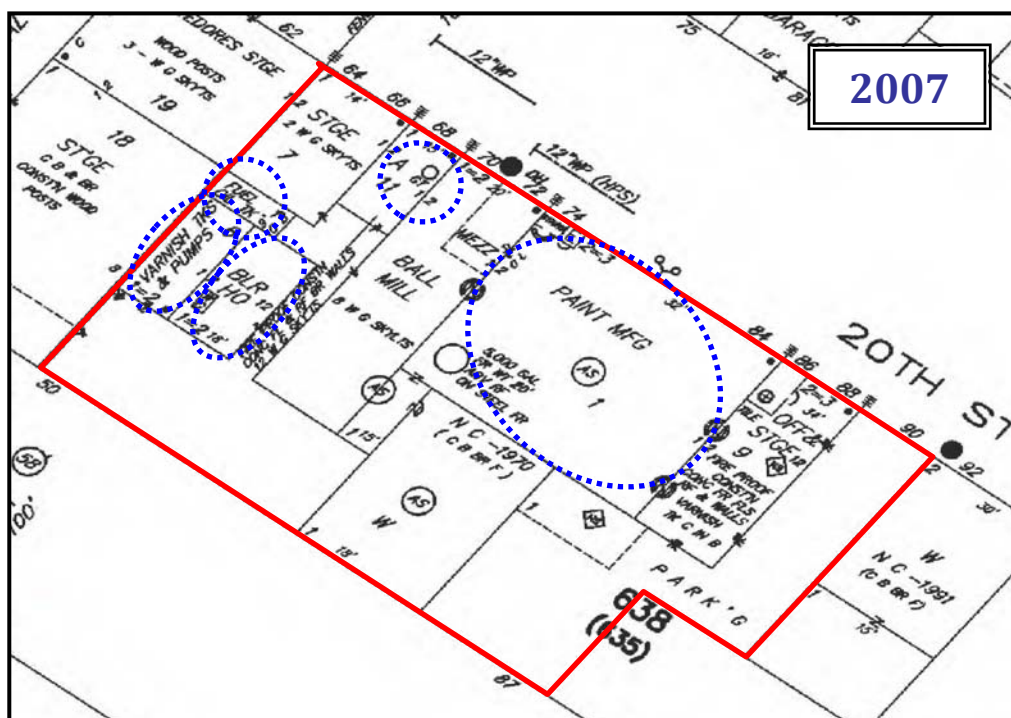


**Site No. 10 - Debevoise Co./Seagrave Coatings Co.
74 20th Street**

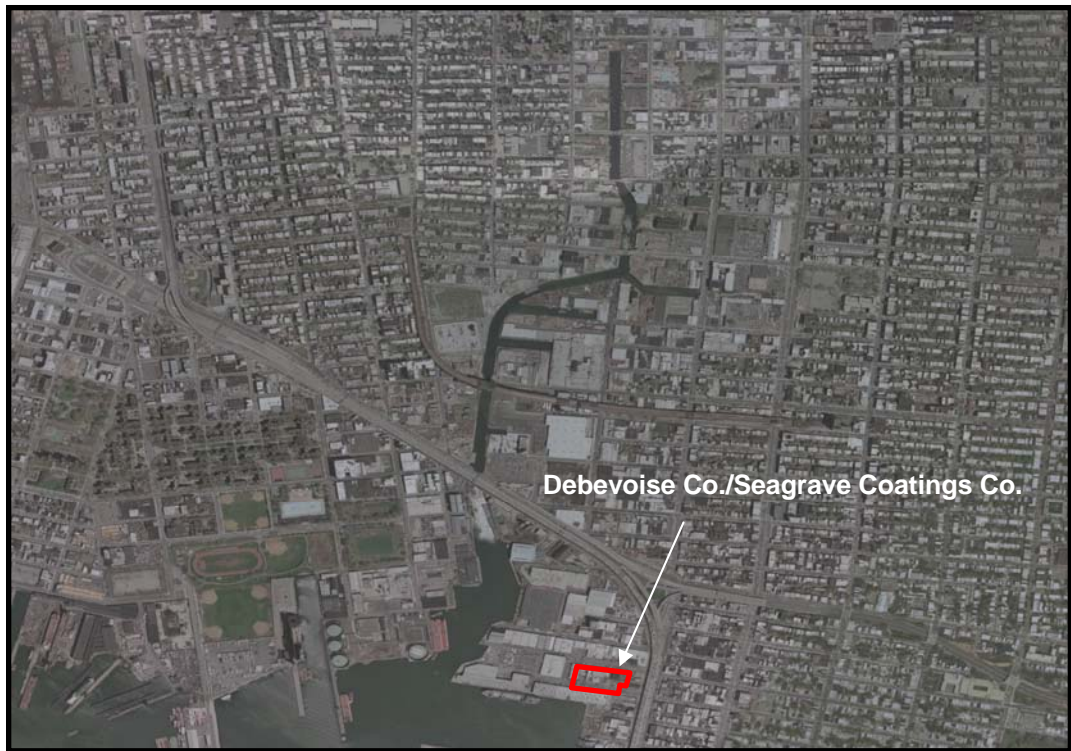
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1906	Grupe & Gldeckner Cedar Mill; JC Van Brent & Sons Saw Mill.	Petroleum products and solvents were probably used for the machinery at this former mill.
1922-1926	H.D. Rosen Co., manufacturers of printing inks – ball mill, boiler house, varnish tanks and pumps, pipe shop storage, color vat room, linseed boiling house.	Various petroleum products, paint, ink, and solvents, were probably stored and used at the former ink manufacturer. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.
1951-2007	Paint Manufacturing	Various petroleum products, paint, ink, solvents, and possibly metal pigments were probably stored and used at the former ink manufacturer. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

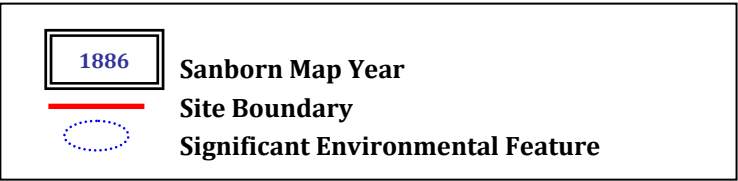
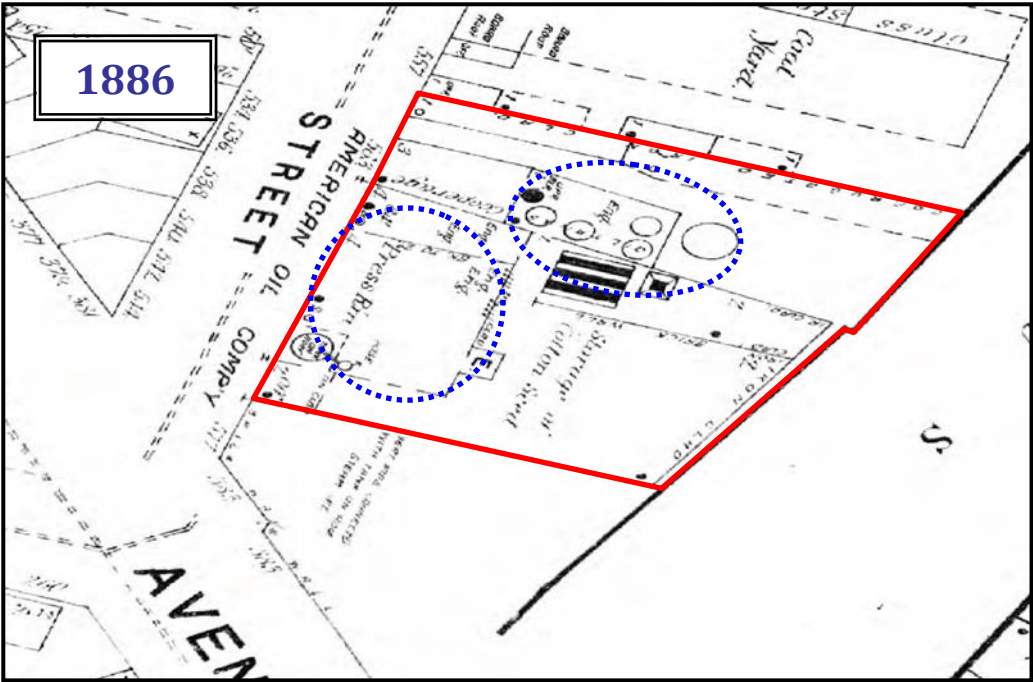


**Site No. 11 - Devoe & Reynolds Inc. Paint Works
381 Smith Street**

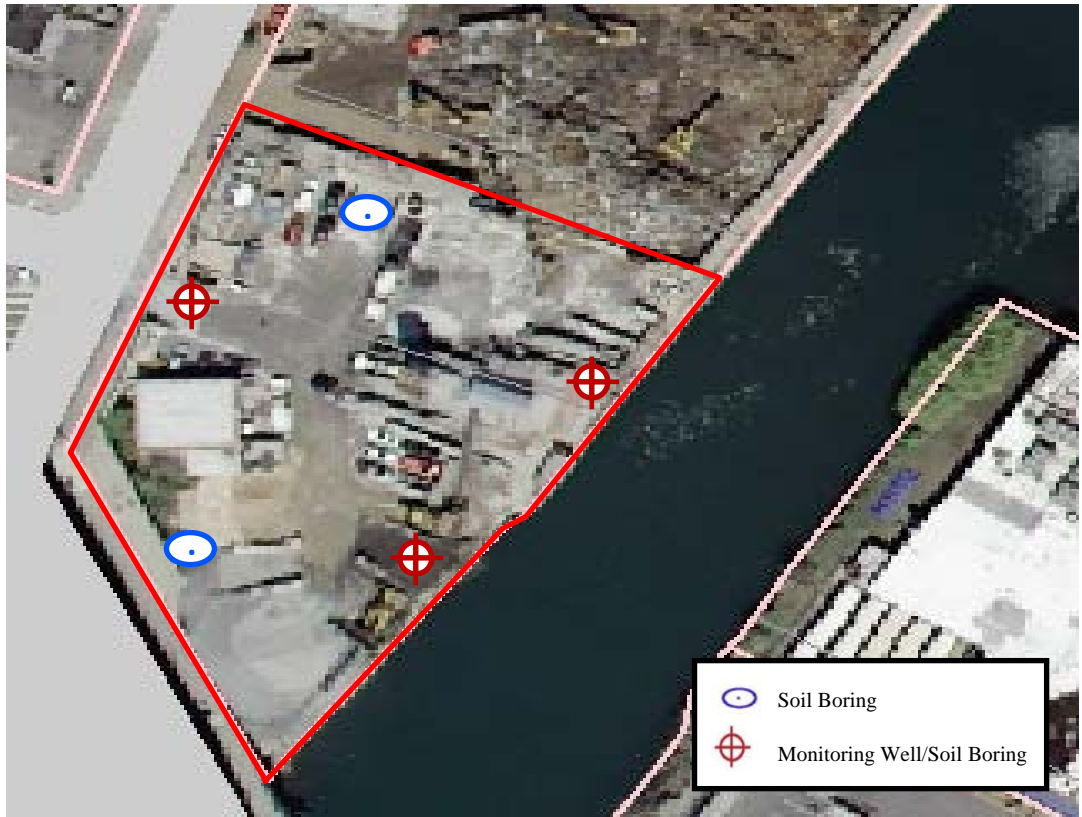
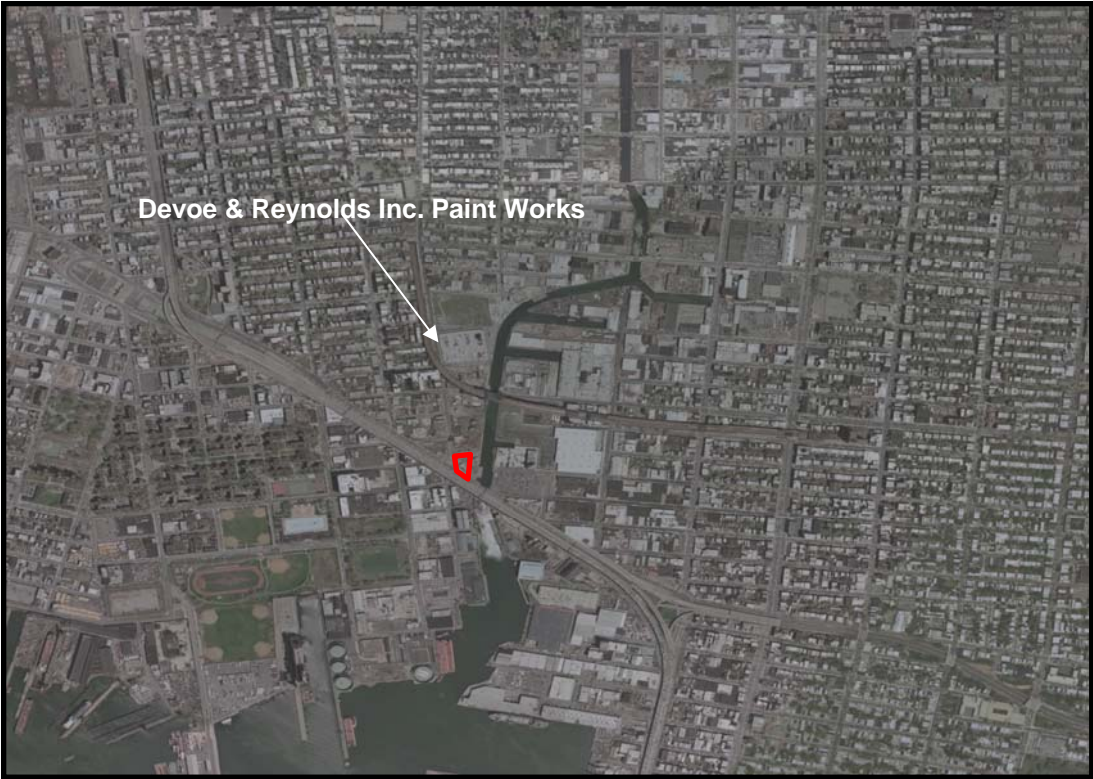
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	American Oil Company: 6 tanks of varying sizes.	A large amount of fuel oil was stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	American Tartar Co. and Schilling Carbon Bisulphide Manufacturing.	A significant amount of chemical and petroleum products were likely stored and handled at this former chemical manufacturing plant. Potential contaminants include metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.
1915-1938	Devoe & Reynolds Inc.: Paint Works.	Petroleum products, solvents, and paint were probably stored and handled at this former paint works. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.
1969	Filling Station and parking.	A large amount of petroleum products was likely stored at the former filling station. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



**Site No. 12 - Greason Son & Dazell Inc. /Pittson Co.
150-154 3rd Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886-1904	P.T. Sharp's Coal and Wood Shed.	A large amount of gasoline was probably stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915-1928	Pure Oil Company – storage sheds, five oil tanks of various sizes, oil pump, wagon filling shed, office.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938-1950	Greason Son & Dalzell – two oil tanks, boiler house, scales, office, car garage.	Petroleum products and solvents were probably used at this property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-1977	Motor Freight Station.	Petroleum products and solvents were probably used during crane maintenance activities. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1979-2007	Crane rental office.	Petroleum products and solvents were probably used during crane maintenance activities.

1938

466

INCLINED DRIFTWAY

PURE OIL COMPANY

STORAGE & FILLING COVERAGE

COAL SHED

GREASON SON & DALZELL COAL YARD

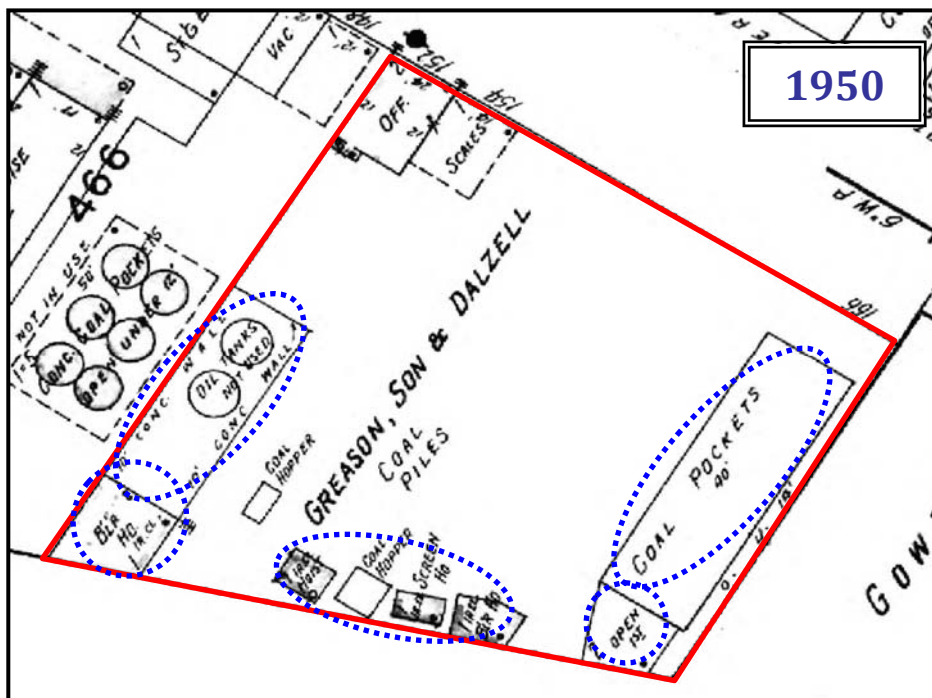
STORAGE

STORAGE FILLING

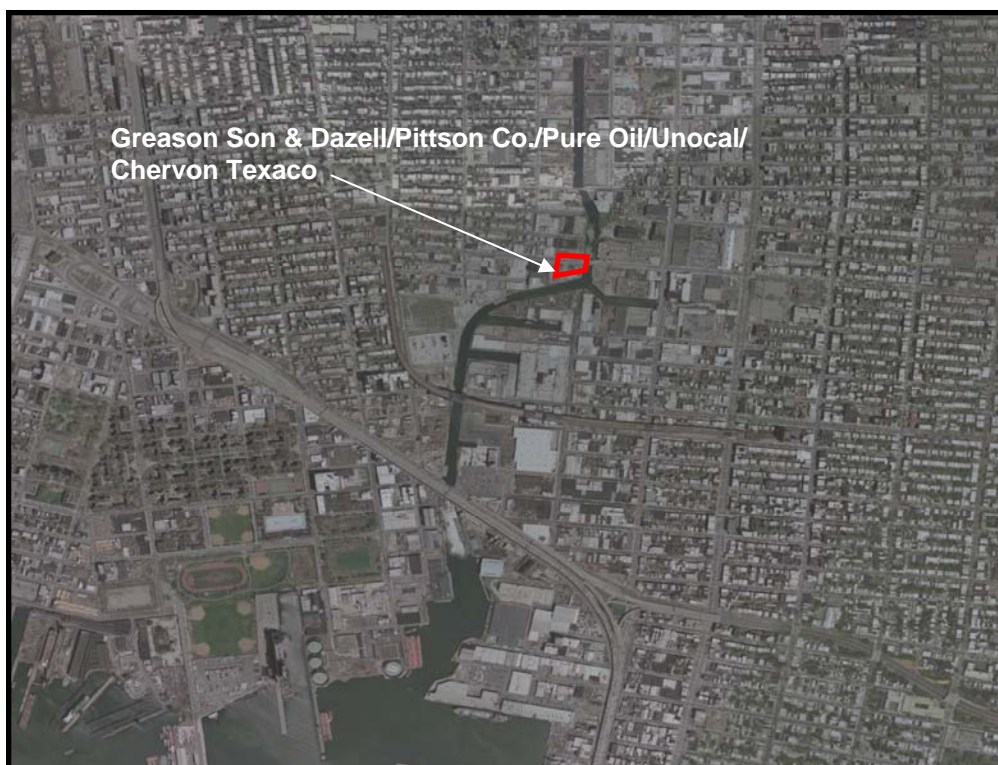
COAL POCKET

6" PIPE (1897) INCLINED

GOWAN



Proposed Well and Boring Locations

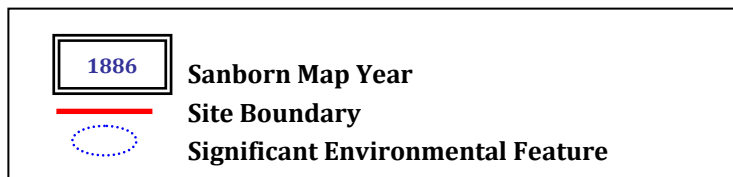
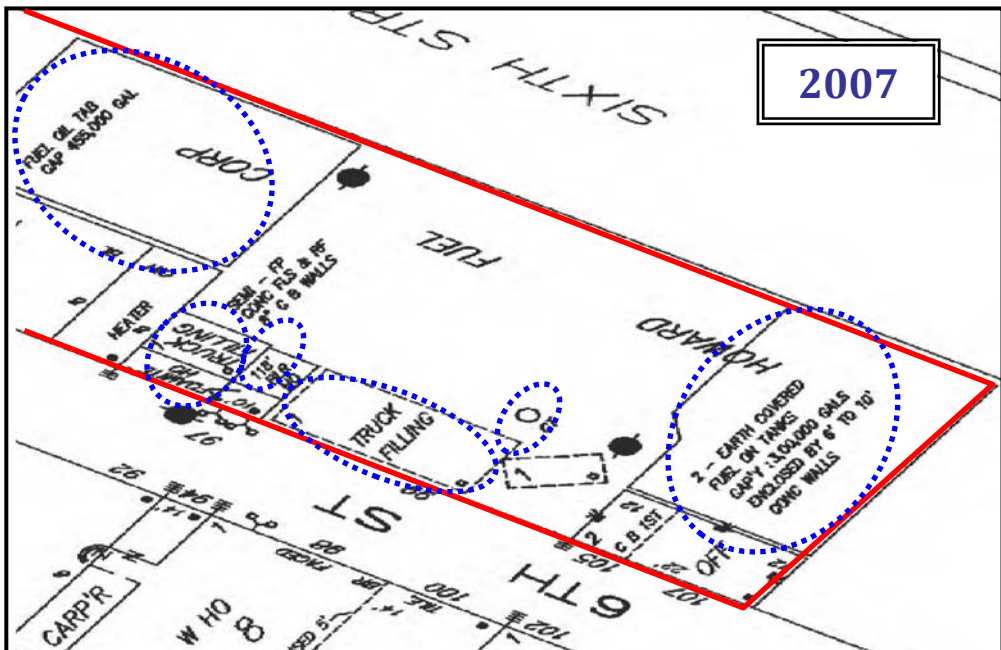
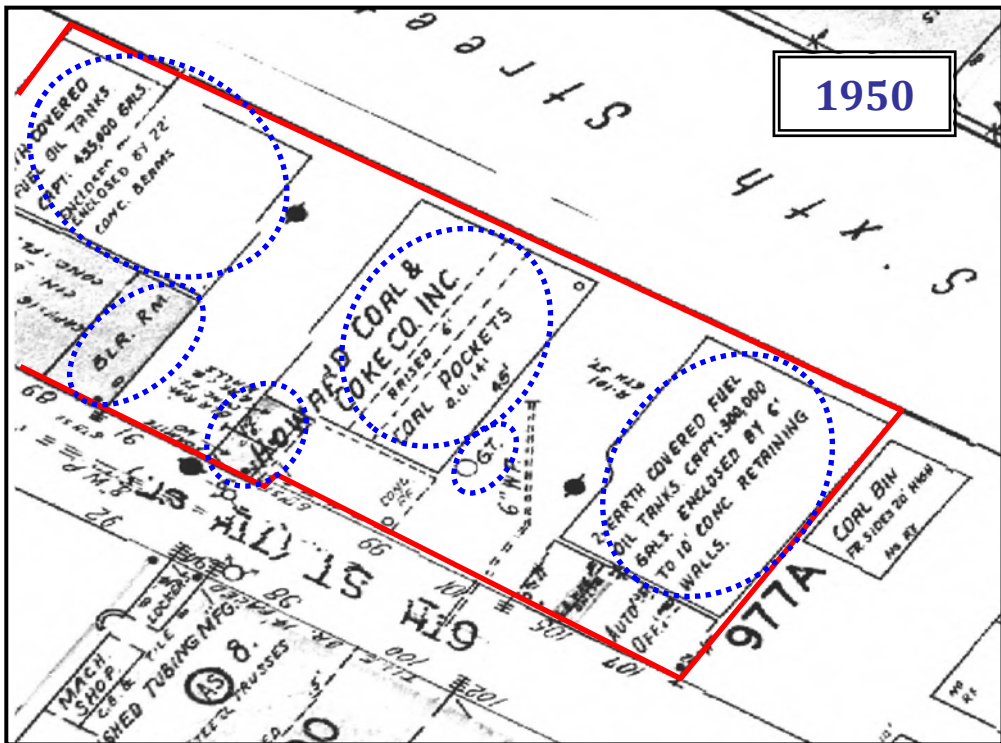


**Site No. 13 - Howard Fuel Corp.
107 6th Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1904	Blacksmith shop; Garbage dump; City Stables.	Petroleum products and solvents were likely used at the former blacksmith.
1938	Howard Coal & Coke Co. Inc. – coal pockets, three coal bins, office with garage, gasoline tank.	A large amount of coal was stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Howard Coal & Coke Co. Inc. – coal pockets, gasoline tank, earth-covered fuel oil tanks with 455,000-gallon capacity enclosed by concrete, boiler room, two earth-covered fuel oil tanks with 300,000-gallon capacity enclosed by concrete retaining walls, coal bin, office, garage, gasoline tank.	A large amount of fuel oil, gasoline, and coal were stored and used at the property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-2007	Howard Fuel Oil Corp. - earth-covered fuel oil tanks with 455,000-gallon capacity enclosed by concrete, heater, two truck filling stations, two earth-covered fuel oil tanks with 300,000-gallon capacity enclosed by concrete retaining walls, office with garage, boiler house, private garage, gasoline tank.	A large amount of fuel oil, gasoline, and coal were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



Site No. 14 - Ira S. Bushey & Sons/Amerada Hess Corporation
764 Court Street

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886-1888	Partially under water, Downing & Lawrence Marine Railway; pattern shop; sail maker.	Petroleum and coal products were likely loaded and unloaded on the railway tracks. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	Downing & Lawrence Dry Docks; saw mill engine; M. Elsesser smithy; pattern storage; machine shop; coal shed; tool house; two hoisting engines. Pollion Shipwrights and Caulkers.	Solvents and various petroleum products were likely stored and used due to the presence of machinery at this property. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	Downing & Lawrence Ship Yard; M. Elsesser machine shop; John Manton, boiler maker; Ira S. Bushey Boat Building.	Petroleum products, solvents, and paint were probably stored and handled from boat building and painting activities at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, xylene, toluene, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene.
1922	Dry docks; Ira S. Bushey & Sons Ship Yard and Boat Building; Mutual Lumber & Towing Co.	Petroleum products, solvents, and paint were probably stored and handled from boat building and painting activities at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, xylene, toluene, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene.

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1928	Dry docks; John M. Nelson & Co. lumber yard	Petroleum products, solvents, and paint were probably stored and handled from boat building and painting activities at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, xylene, toluene, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene.
1938	Dry docks; Ira S. Bushey & Sons Inc Boat Building; two machine shops; storage buildings and sheds; garages; plate shop. Six buried fuel oil tanks with capacities of 54,000 gallons each; Todd Ship yards Corp. – plate shop, machine shop and gasoline tank of unidentified quantity.	Petroleum products, solvents, and paint were probably stored and handled from boat building and painting activities at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, xylene, toluene, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene.
1950	Dry docks; Ira S. Bushey & Sons Inc Boat Building; two machine shops; storage buildings and sheds; garages; plate shop; two oil derricks; cranes, boiler room, air compressor room; Patchogue Oil Terminal Plant No. 2: six fuel oil tanks under earth embankment with capacities of 1,867,000 gallons, 3,729,000 gallons, 1,380,000 gallons, 1,062,000 gallons, 1,380,000 gallons, and 2,064,000 gallons; eleven underground tanks with capacities of 54,000 gallons (6), 450,000 gallons (2), 72,000 gallons (2), 90,000 gallons (1), pump house and office.	In addition to the storage and handling of solvents, paint, various petroleum products from the boat building activities, a large amount of fuel oil was stored and used at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene. benzene, toluene, xylene, phenol, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs

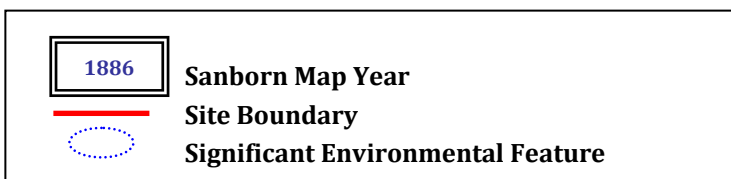
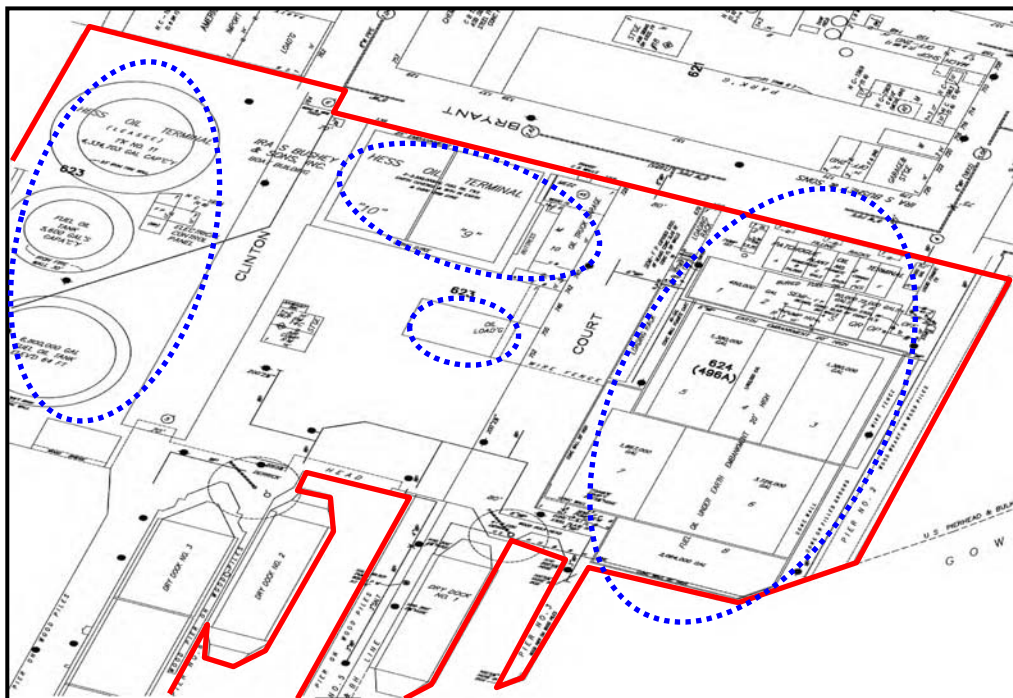
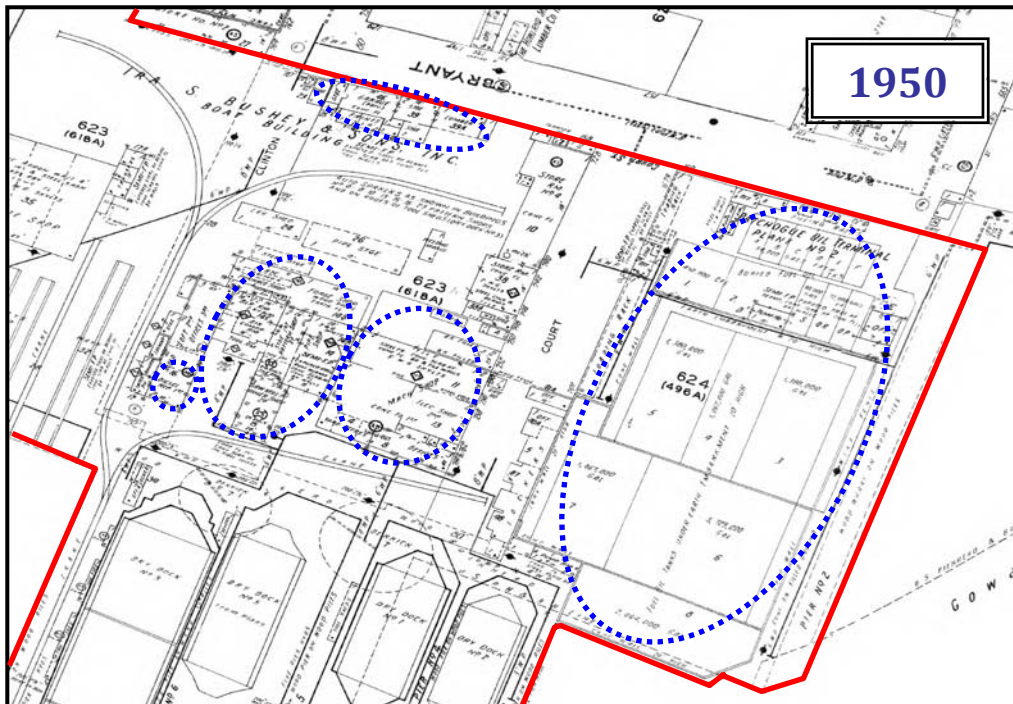
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Dry docks; Ira S. Bushey & Sons Inc Boat Building; two machine shops; storage buildings and sheds; garages; plate shop; two oil derricks; cranes, boiler room, air compressor room; Patchogue Oil Terminal Plant No. 2: six fuel oil tanks under earth embankment with capacities of 1,867,000 gallons, 3,729,000 gallons, 1,380,000 gallons, 1,062,000 gallons, 1,380,000 gallons, and 2,064,000 gallons; eleven underground tanks with capacities of 54,000 gallons (6), 450,000 gallons (2), 72,000 gallons (2), 90,000 gallons (1), pump house and office.	In addition to the storage and handling of solvents, paint, various petroleum products from the boat building activities, a large amount of fuel oil was stored and used at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene. benzene, toluene, xylene, phenol, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs
1969	Ira S. Bushey & Sons Inc Boat Building; Patchogue Oil Terminal Plant No. 1: plate shop; one 4,394,703-gallon aboveground storage tank; two 2,900,000-gallon underground storage tanks; Micron Chemical Products; two oil derricks; Patchogue Oil Terminal Plant No. 2: six fuel oil tanks under earth embankment with capacities of 1,867,000 gallons; 3,729,000 gallons, 1,380,000 gallons, 1,062,000 gallons, 1,380,000 gallons, and 2,064,000 gallons; eleven underground tanks with capacities of 54,000 gallons (6), 450,000 gallons (2), 72,000 gallons (2), 90,000 gallons (1), pump house and office.	In addition to the storage and handling of solvents, paint, various petroleum products from the boat building activities, a large amount of fuel oil was stored and used at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene. benzene, toluene, xylene, phenol, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs

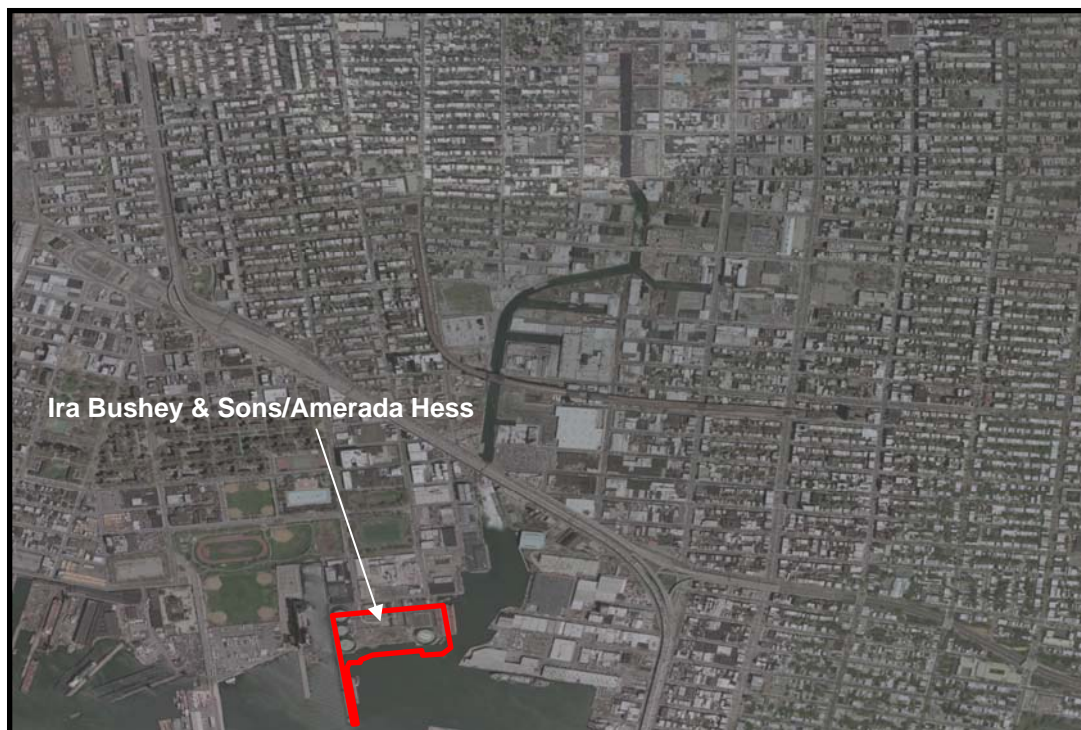
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1977- 1988	Ira S. Bushey & Sons Inc Boat Building; Patchogue Oil Terminal Plant No. 1: two fuel oil tanks of 5,600-gallon and 5,800,000-gallon capacity replacing plate shop; one 4,394,703-gallon aboveground storage tank; two 2,900,000-gallon underground storage tanks; Micron Chemical Products added to Terminal No. 1. Terminal No. 2 remained generally unchanged.	In addition to the storage and handling of solvents, paint, various petroleum products from the boat building activities, a large amount of fuel oil was stored and used at the property. Potential contaminants include metal compounds (lead, copper, zinc, nickel, chromium, etc.), tri-butyl-tin, PCBs, methyl ethyl ketone, methyl isobutyl ketone, and ethylbenzene. benzene, toluene, xylene, phenol, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs
1991- 2007	Major Oil Storage facility re-named Hess Oil Terminal; smaller buildings: pump houses, plate shops, machine shops, etc. removed. Terminal No. 2 still identified.	A large amount of fuel oil was stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

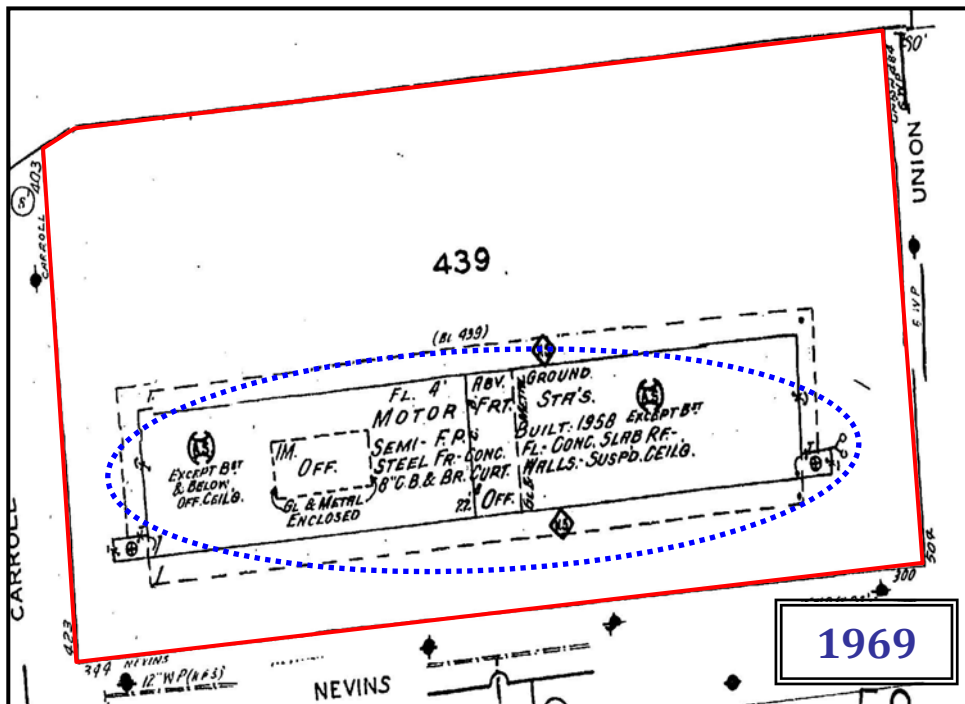
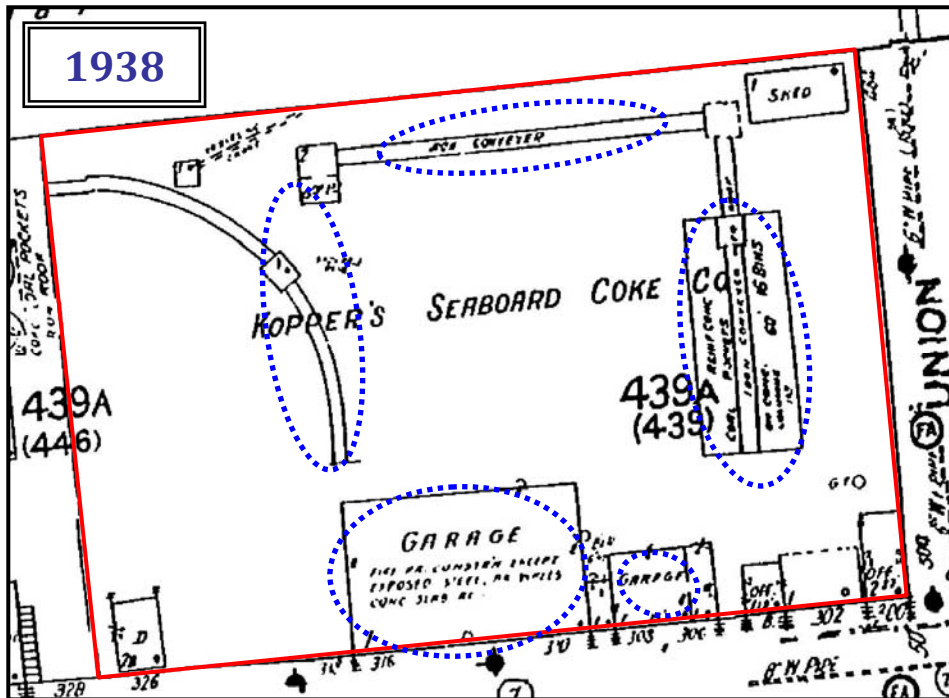


**Site No. 15 - Koppers Company/Beazer Materials
300-326 Nevins Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Kenyon & Newton's Lumber Yard.	Petroleum products and solvents were probably used for the machinery at this former timber yard.
1904 -1915	Albro J. Newton Company Lumber Yard	Petroleum products and solvents were probably used for the machinery at this former timber yard.
1938	Koppers Seaboard Cole Co. – two garages, sheds, gasoline tank.	Petroleum products and coal were stored and handled at this former coal yard. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Koppers Co. Inc. – coke piles, private garage, coke pockets and piles, garage, gasoline tank, travelling crane.	Petroleum products and coal were stored and handled at this former coal yard. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969 -1977	Motor freight stations, elevated 4 feet above ground; offices.	Petroleum products and solvents were probably used at this property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



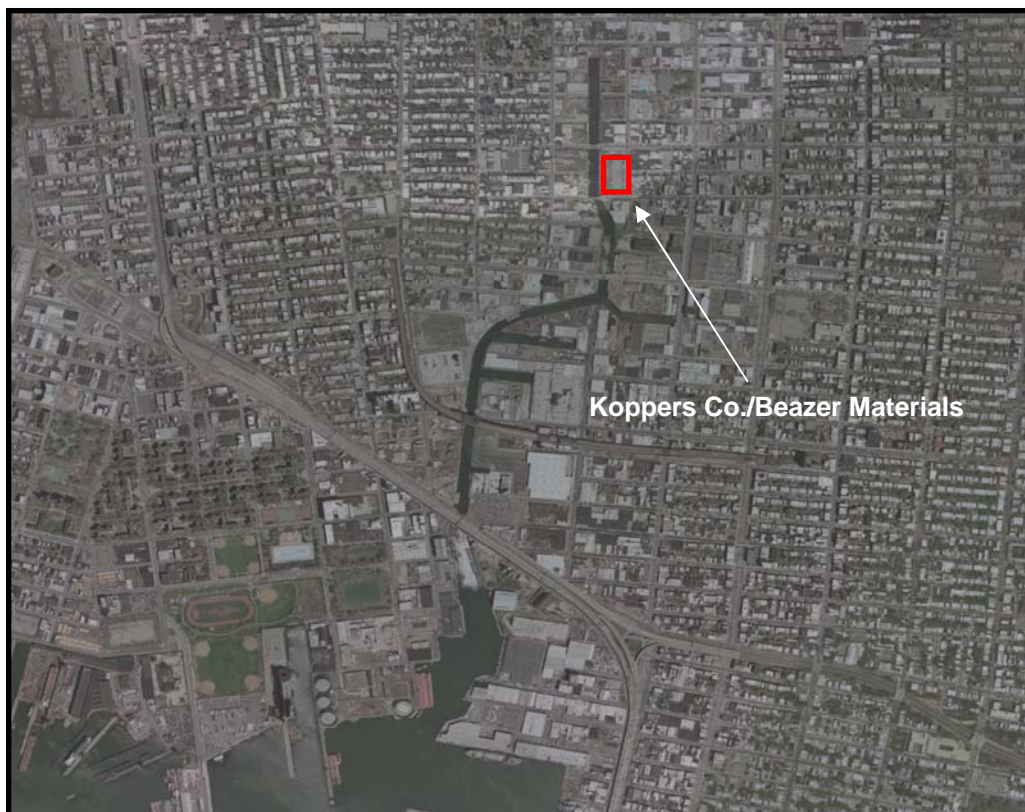
1886

Sanborn Map Year

Site Boundary

Significant Environmental Feature

Proposed Well and Boring Locations

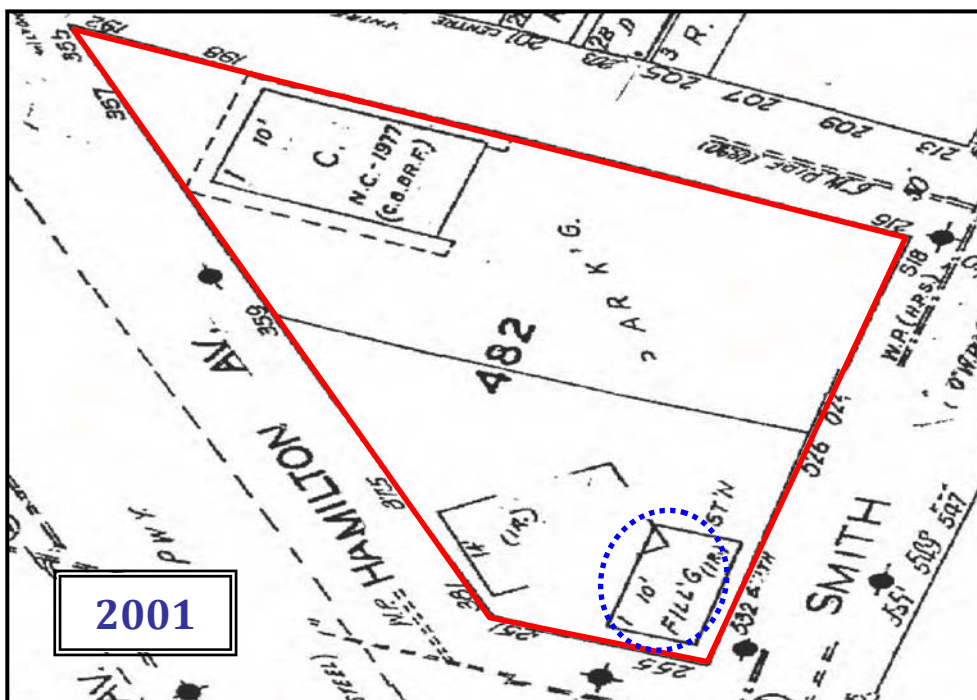
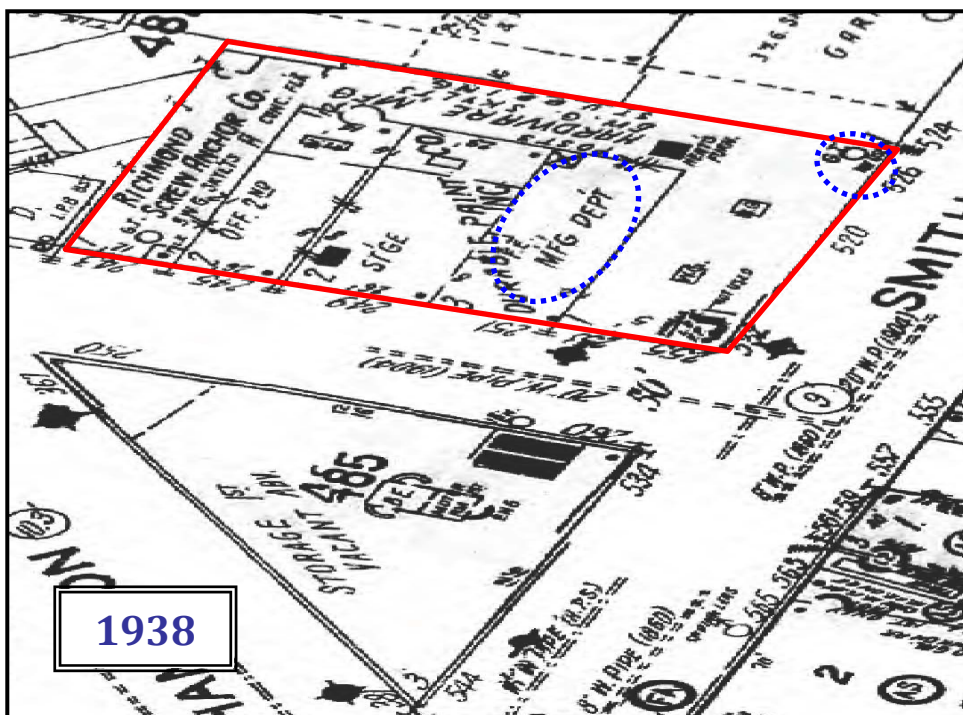


**Site No. 16 - Mobil Service Station/Exxon Mobil
375 Hamilton Avenue**

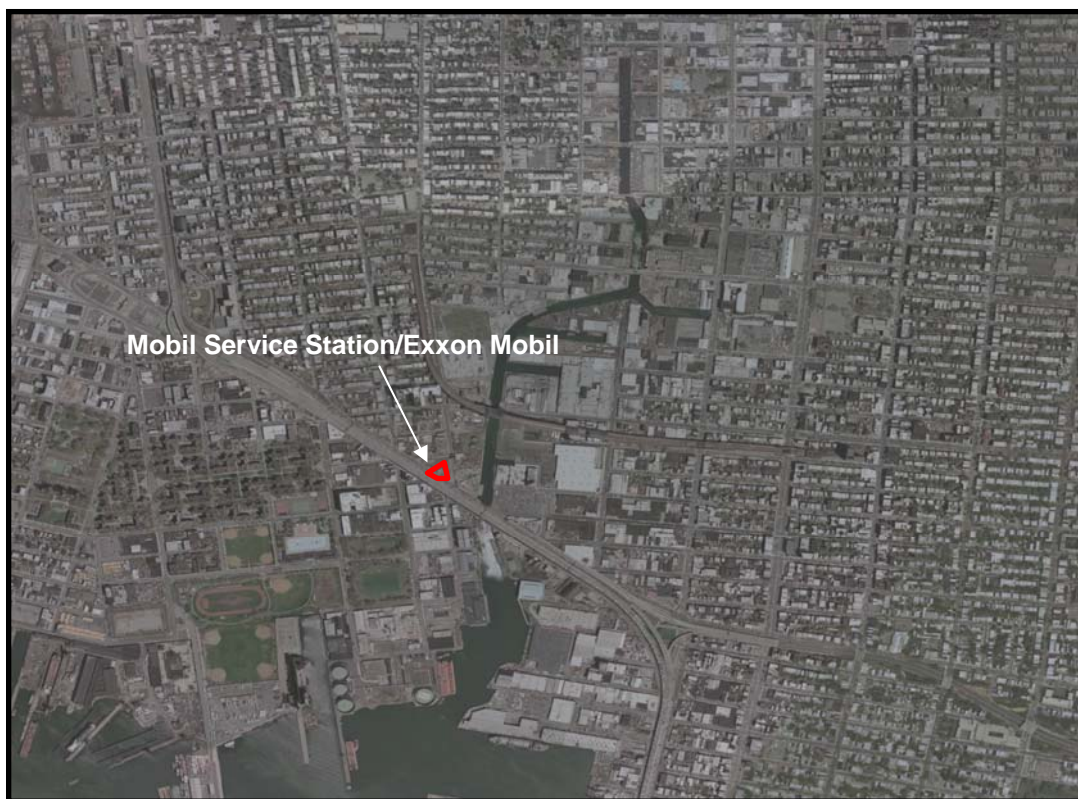
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1904	Lefferts & Jones Galvanizing & Tinning Works.	Various petroleum products and solvents were probably stored and used at the former metal works. Potential contaminants include metal compounds, cresol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1938	Durable Paint Co.: paint manufacturing; hardware manufacturing.	Various petroleum products, paint, solvents, and possibly metal pigments were probably stored and used at the former paint and hardware manufacturer. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.
1950	Durable Paint Co.: paint manufacturing; plastic manufacturing.	Various petroleum products, paint, ink, solvents, and possibly metal pigments were probably stored and used at the former paint and plastic manufacturer. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.
1969	Durable Paint Co.: plating	Various petroleum products, paint, solvents, and electroplating chemical solutions were probably stored and used at the former paint manufacturer. Potential contaminants include metals (zinc, copper, lead, chromium, cadmium, and cobalt compounds), PCBs, xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, and phenol.
1977-2007	Filling Station.	A large amount of petroleum products was likely stored at the filling station. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

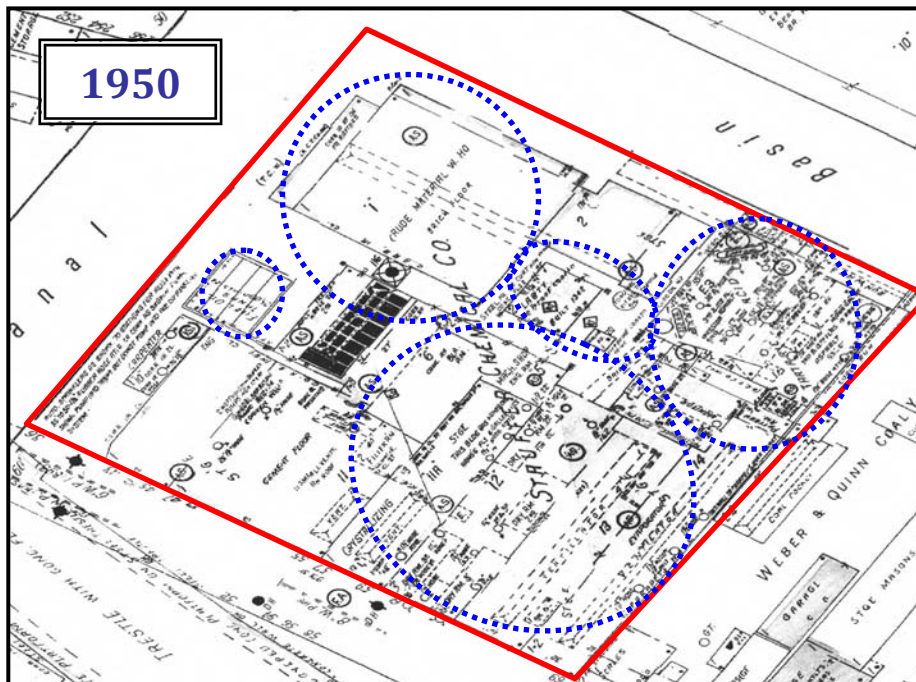
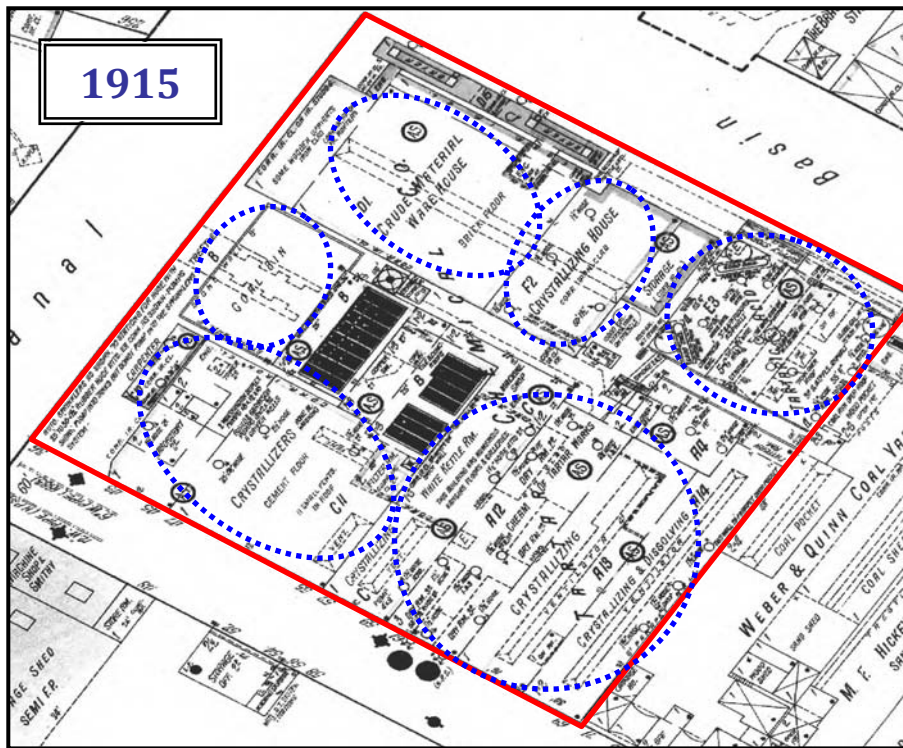


**Site No. 17 - New York Tartar/Standard Brands/Nabisco/
Stauffer Chemical/Chesebrough/Unilever Ltd.
59 9th Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	New York Tartar Company – crystallizers, warehouse, coal shed, copper storage, cream of tartar & tartaric acid works, crystals.	A large amount of chemical and acidic products and heavy metals was probably stored and handled at this chemical manufacturing plant. Potential contaminants include metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.
1904-1928	Tartar Chemical Company – crystallizers, coal bin, crude material warehouse, 10,000-gallon vitriol tank.	A large amount of chemical and acidic products and heavy metals was probably stored and handled at this chemical manufacturing plant. Potential contaminants include metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.
1938	Tartar Chemical Company – crystallizers, coal bin, crude material warehouse, 10,000-gallon vitriol tank. Royal Baking Powder Co. – laboratory.	A large amount of chemical and acidic products and heavy metals was probably stored and handled at this chemical manufacturing plant. Potential contaminants include metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.
1950	Stauffer Chemical– crude material warehouse, crystallizing houses and buildings, tartaric acid storage, four 26,000-gallon fuel oil tanks.	In addition to the chemical and acidic products and heavy metals probably stored and handled at this chemical manufacturing plant, a large amount of fuel oil was used at this property. Potential contaminants include metal compounds (zinc, copper, nickel, lead, chromium, arsenic, cadmium, etc.), xylene, methyl ethyl ketone, naphthalene, benzene, dimethyl phthalate, phenol, chloroform, and various acids.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

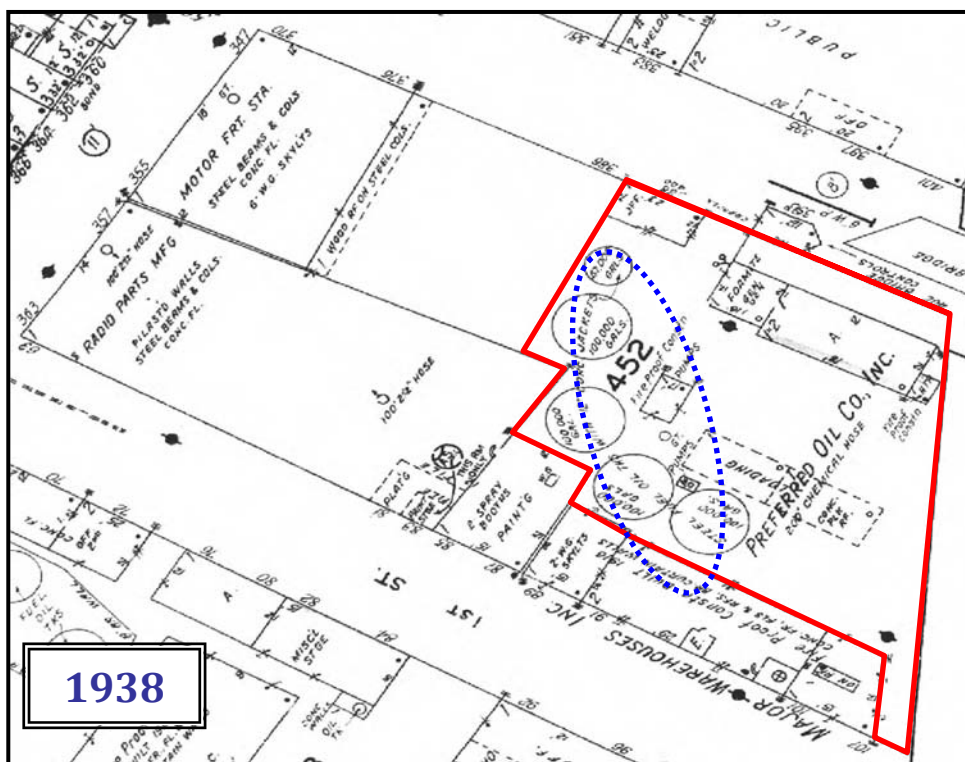


**Site No. 18 - Pure Oil Co./ Preferred Oil Co. /Unocal/Chervon Texaco
400 Carroll Street**

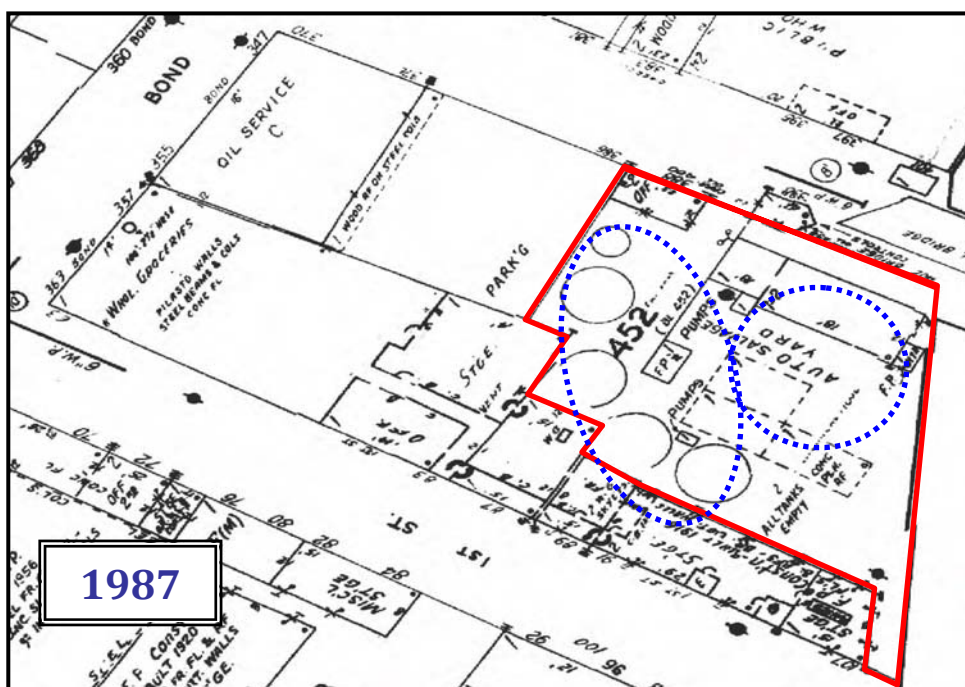
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886-1904	Watson & Pittinger: timber yard.	Petroleum products and solvents were probably used for the machinery at this former timber yard.
1938	Pure Oil Co.: Four fuel oil tanks, each with 100,000-gallon capacities, one 67,000-gallon fuel oil tank, pump house, office, garage, loading area.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Preferred Oil Co.: Four fuel oil tanks, each with 100,000-gallon capacities, one 67,000-gallon fuel oil tank, pump house, office, filling house, garage.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	Marine equipment storage, gasoline tank of unknown capacity, fuel oil tanks listed as empty.	A large amount of petroleum products was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1977-1988	Auto salvage yard, fuel oil tanks listed as empty.	Petroleum product and chemical products were likely released as a result of auto disassembling at this former auto salvage yard. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



1938



1987

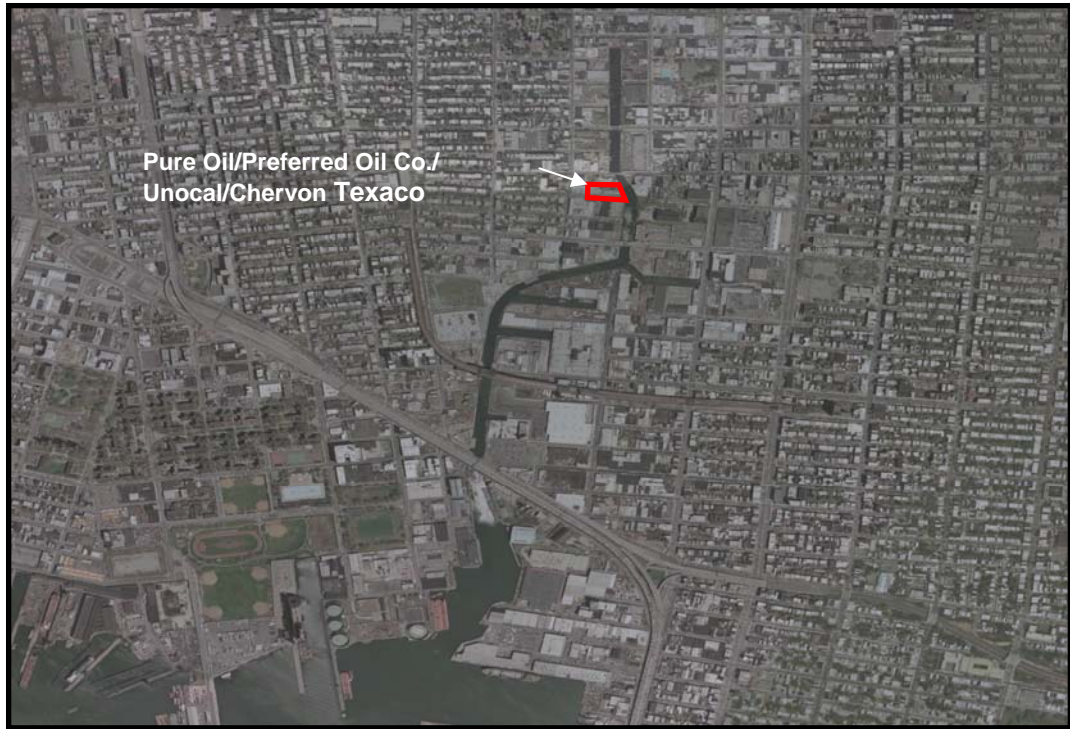
1886

Sanborn Map Year

Site Boundary

Significant Environmental Feature

Proposed Well and Boring Locations

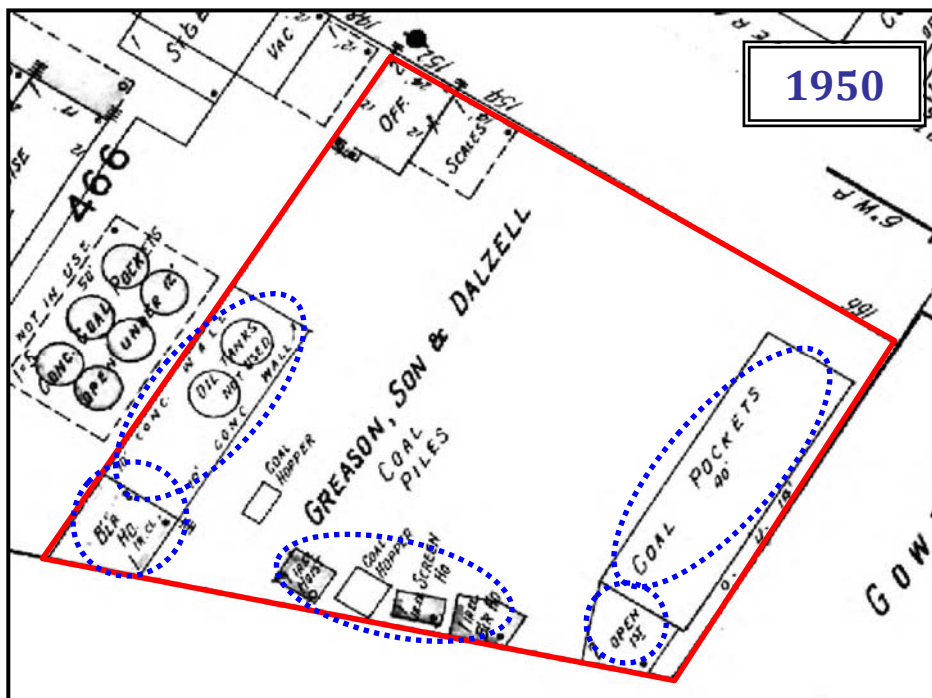
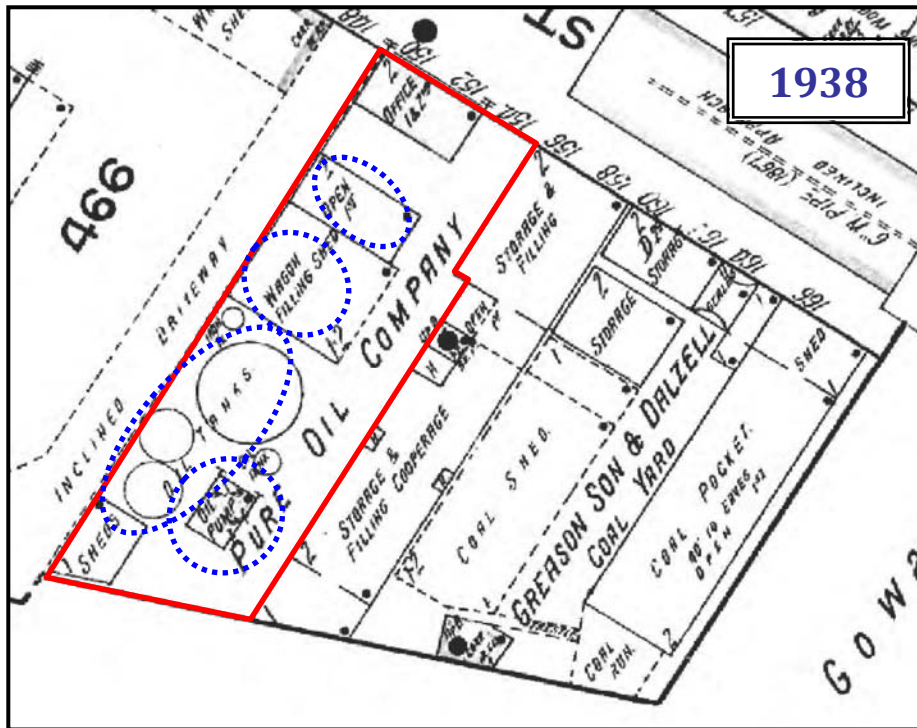


Site No. 19 - Pure Oil Co./Unocal/Chervon Texaco
150-154 3rd Street

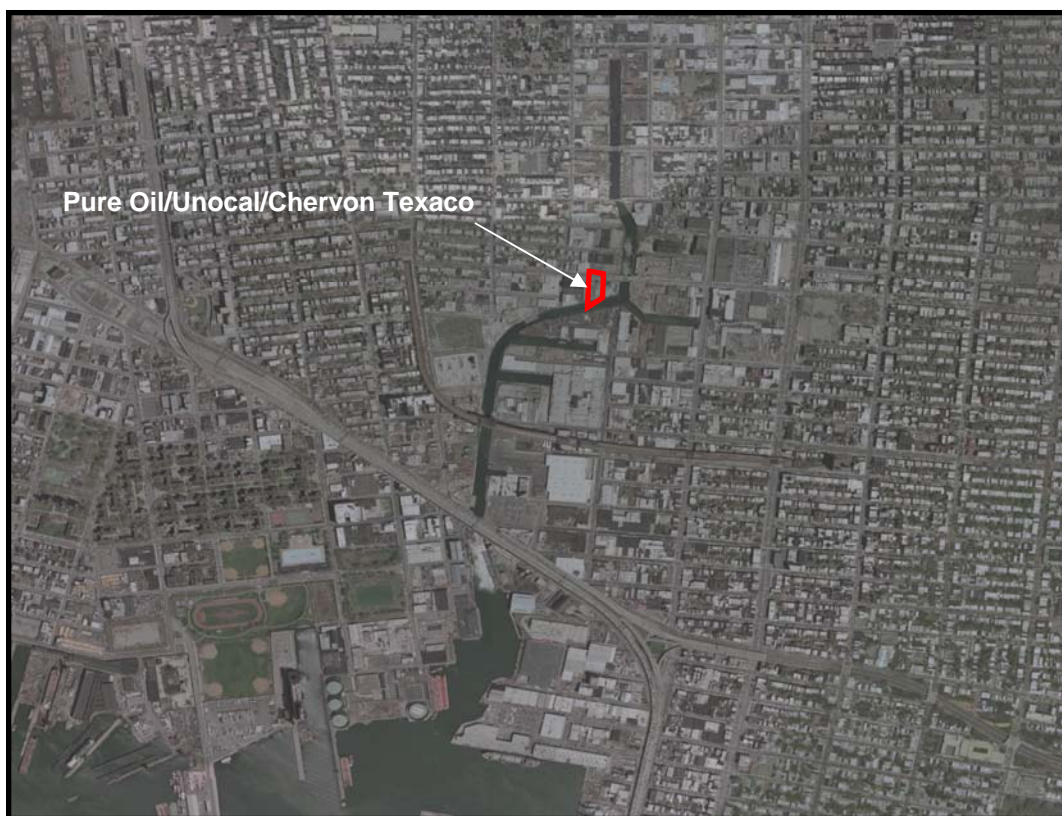
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886-1904	P.T. Sharp's Coal and Wood Shed.	Petroleum products and coal were stored and handled at this former coal yard. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915-1928	Pure Oil Company – storage sheds, five oil tanks of various sizes, oil pump, wagon filling shed, office.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938-1950	Greason Son & Dalzell – two oil tanks, boiler house, scales, office, car garage.	Petroleum products and solvents were probably used at this property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-1977	Motor Freight Station.	Petroleum products and solvents were probably used at this property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1979-2007	Crane rental office.	Petroleum products and solvents were probably used during crane maintenance activities.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

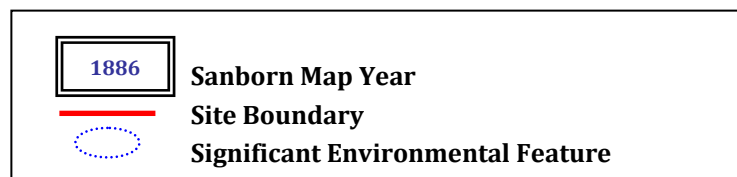
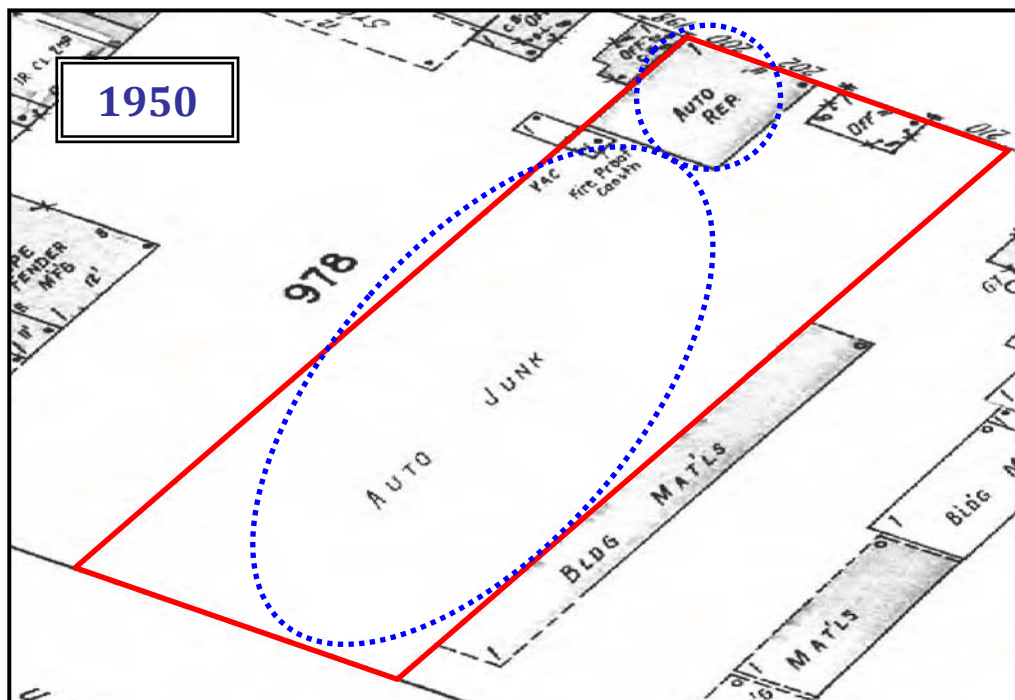
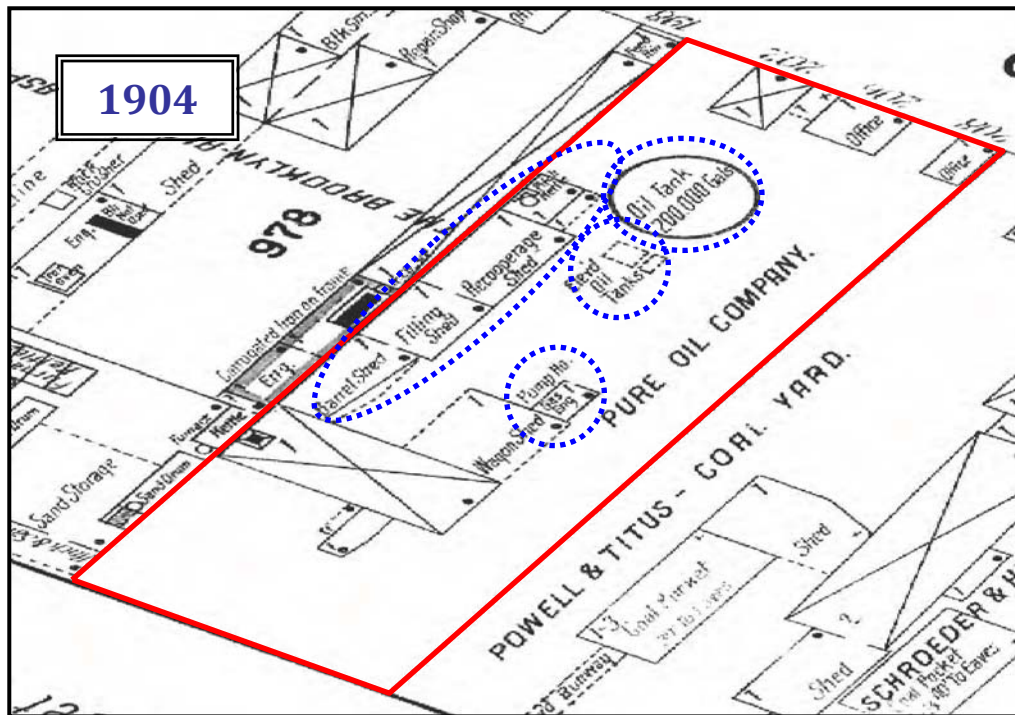


**Site No. 20 - Pure Oil Co./Unocal/Chervon Texaco
200-210 3rd Street**

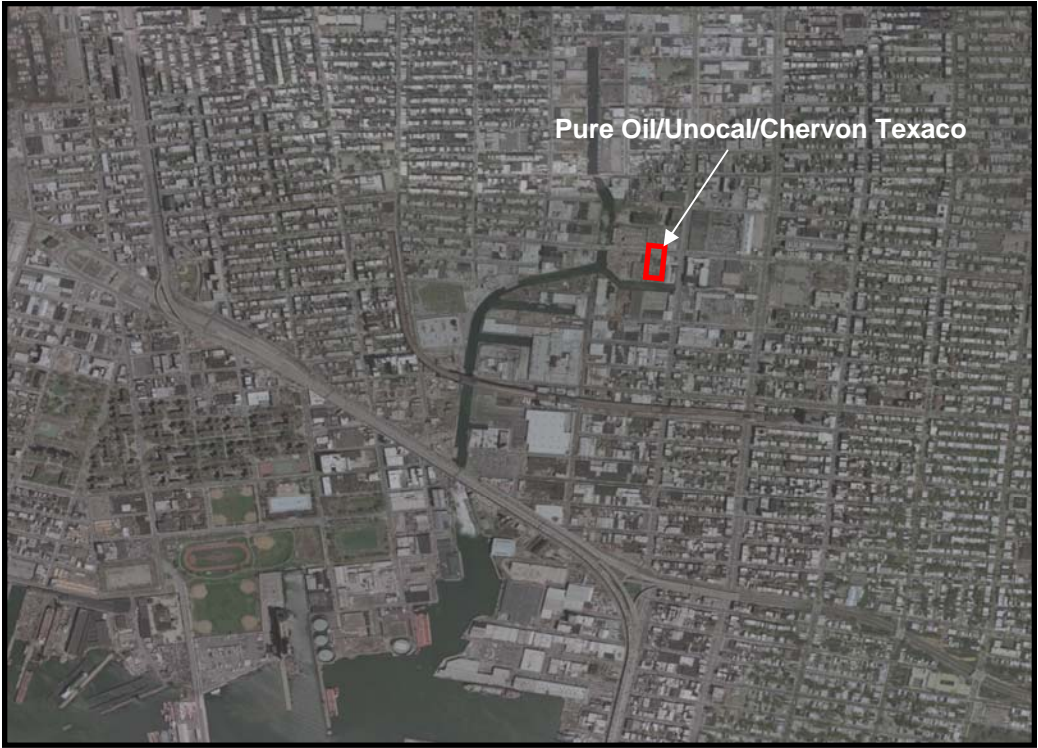
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	J.E. Litchfield & Co.'s Lumber Yard	Petroleum products and solvents were probably used for the machinery at this former lumber yard.
1904	Pure Oil Company – stable, barrel shed, filling shed, cooperage shed, wagon shed, pump house, gas engine, two elevated oil tanks, one oil tank with 200,000-gallon capacity, two office buildings.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	John Morton Son's Co. builders material – brick & cement shed, tile storage, office, blacksmith.	Petroleum products and solvents were likely used at the blacksmith.
1938	Carroll Trucking Corp. – storage buildings, garages, office, vacant building.	Petroleum products and solvents were probably used at this former trucking company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Auto repair and junkyard with office building.	Petroleum products, solvents, and paint were probably used at this former auto repair and junkyard company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-2005	Auto repair facility, tile products storage.	Petroleum products, solvents, and paint were probably used at this former auto repair and junkyard company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



**Site No. 21 - Standard Oil Co./Vesta Oil Works/Exxon Mobil
365 Bond Street**

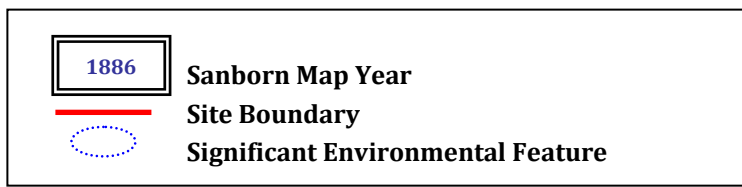
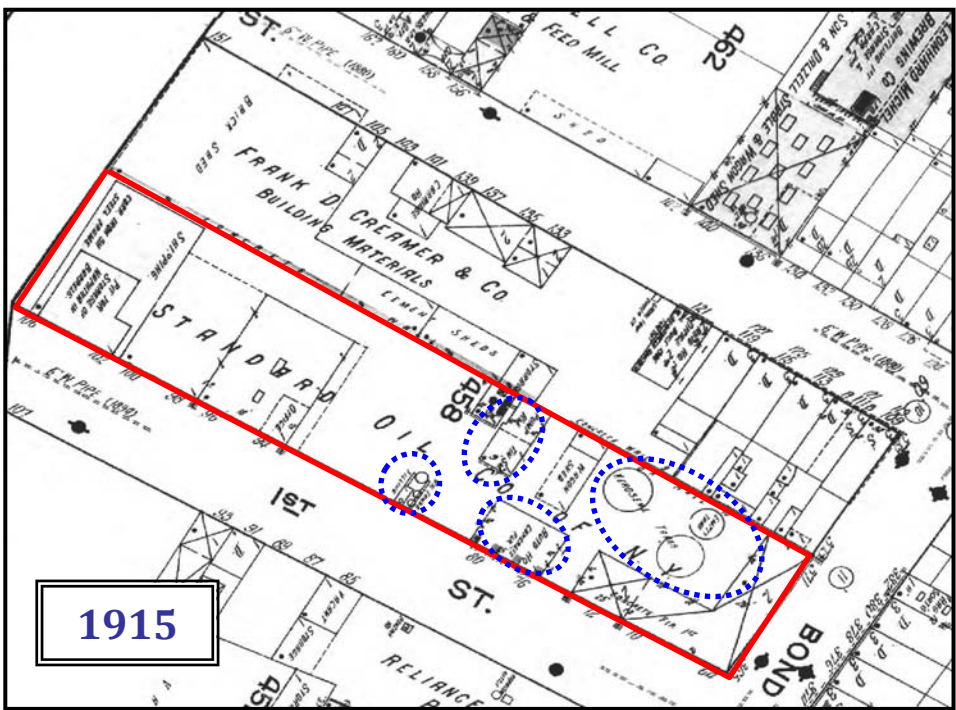
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Vesta Oil Works: 9 oil tanks, two agitators, four unidentified circular structures that may be tanks, fill room, pump house, cooperage. Christian Building Materials.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	Standard Oil Co.: six oil tanks, pump house, three wagon sheds/houses, office. Frank D. Creamer & Co. building materials – brick and cement sheds.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	Standard Oil Co.: two kerosene tanks, one empty tank, pump room, auto house, wagon shed, pit for storage of Naphthalene in barrels, oil tank/filling area. Frank D. Creamer & Co. building materials – brick and cement sheds; carriage and auto houses.	A large amount of kerosene, petroleum products, and naphthalene were stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	Standard Oil Co. of NY: Fleer & Fleer, Inc. (tenants) - two fuel oil tanks; two auto houses, storage, garage. Foreman-Blades Lumber Co., Inc. (tenants) - lumber storage and warehouses.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

**Standard Oil Co./Vesta Oil Works/Exxon Mobil
365 Bond Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Philips Paper Products Inc; machine shop, storage buildings, offices, private garage; two fuel oil tanks, three garages, vacant building; paper box manufacturing.	Petroleum products and solvents were probably used for the operation of the machinery at this former company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	Normandy Elec. Wire & Cable Co.; machine shop; warehouses and storage areas.	Petroleum products and solvents were probably used for the operation of the machinery at this former company. Potential contaminants include metals, chlorinated and organic solvents.
1977-2007	Warehouse; machine shop; storage buildings, lofts, parking lots.	Petroleum products and solvents were probably used for the operation of the machinery at this former company. Potential contaminants include metals, chlorinated and organic solvents.



Proposed Well and Boring Locations



**Site No. 22 - Supreme Oil Terminal/Bayside Fuel Oil Depot Corp.
510 Sackett Street**

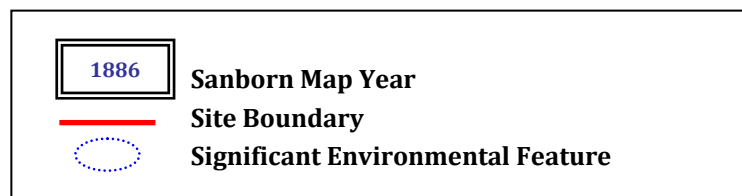
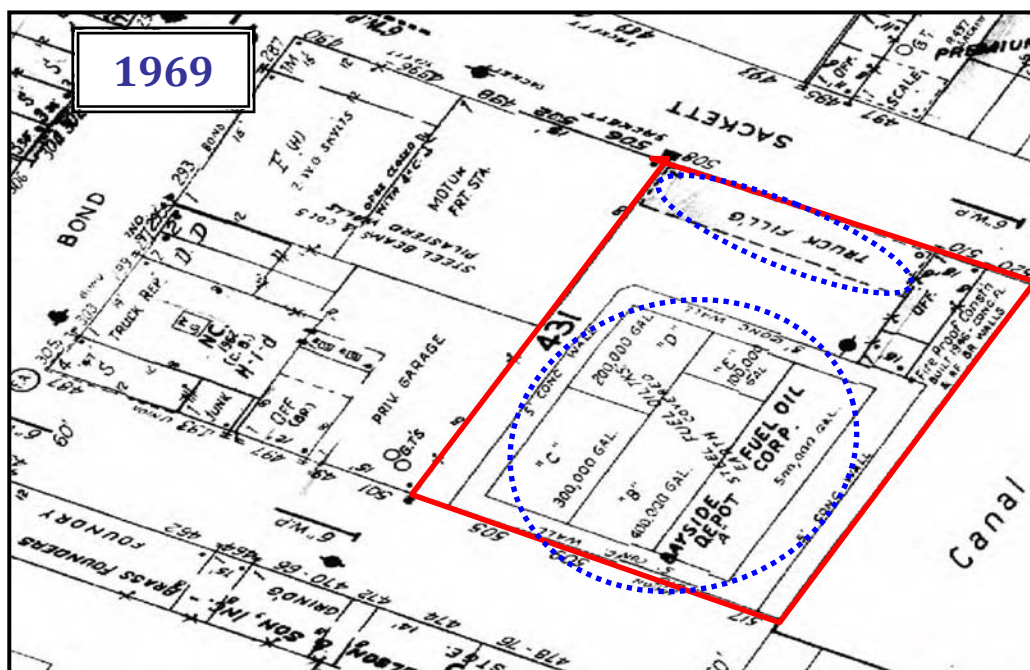
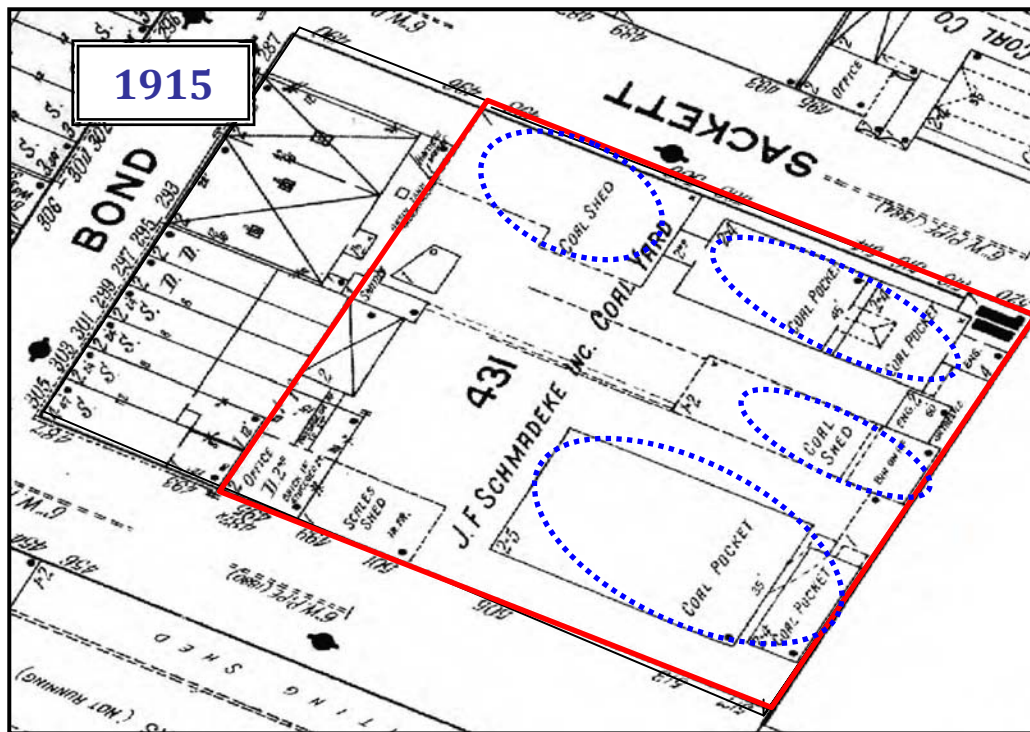
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	J. F. Schmadeke Inc. Coal Yard; Dykeman's Coal Yard; multiple coal pockets.	Petroleum products and coal were used and stored at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904-1915	J. F. Schmadeke Inc. Coal Yard: multiple coal pockets and coal sheds.	Petroleum products and coal were used and stored at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1922-1928	Commonwealth Fuel Co.	A large amount of fuel oil was probably stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	Magnet Fuel Corporation: multiple coal pockets.	Petroleum products and coal were used and stored at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

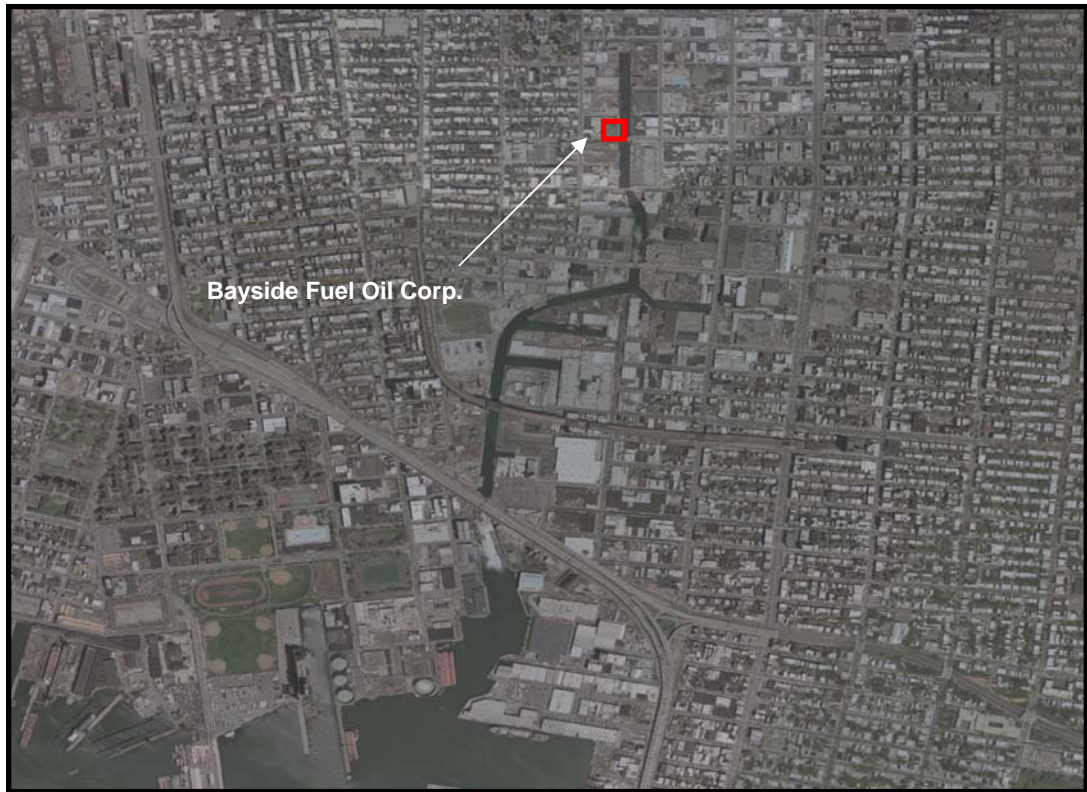
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Supreme Oil Terminal Corp.: Two private garages; two auto repair facilities, one with two gasoline tanks; steel fuel oil tanks (earth-covered) in the following capacities: one 500,000-gallon; one 400,000-gallon; one 300,000-gallon; one 200,000-gallon; and one 100,000-gallon; all encased by a 5' concrete wall; offices; truck filling area; motor freight station.	A large amount of fuel oil and solvent were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969- 2007	Bayside Fuel Oil Depot Corp.: Two private garages; two auto/truck repair facilities; steel fuel oil tanks (earth-covered) in the following capacities: one 500,000-gallon; one 400,000-gallon; one 300,000-gallon; one 200,000-gallon; and one 100,000-gallon; all encased by a 5' concrete wall; offices; truck filling area; motor freight station; junkyard.	A large amount of fuel oil and solvent were stored and used at the property. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations

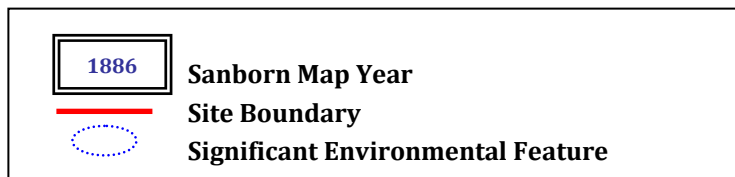
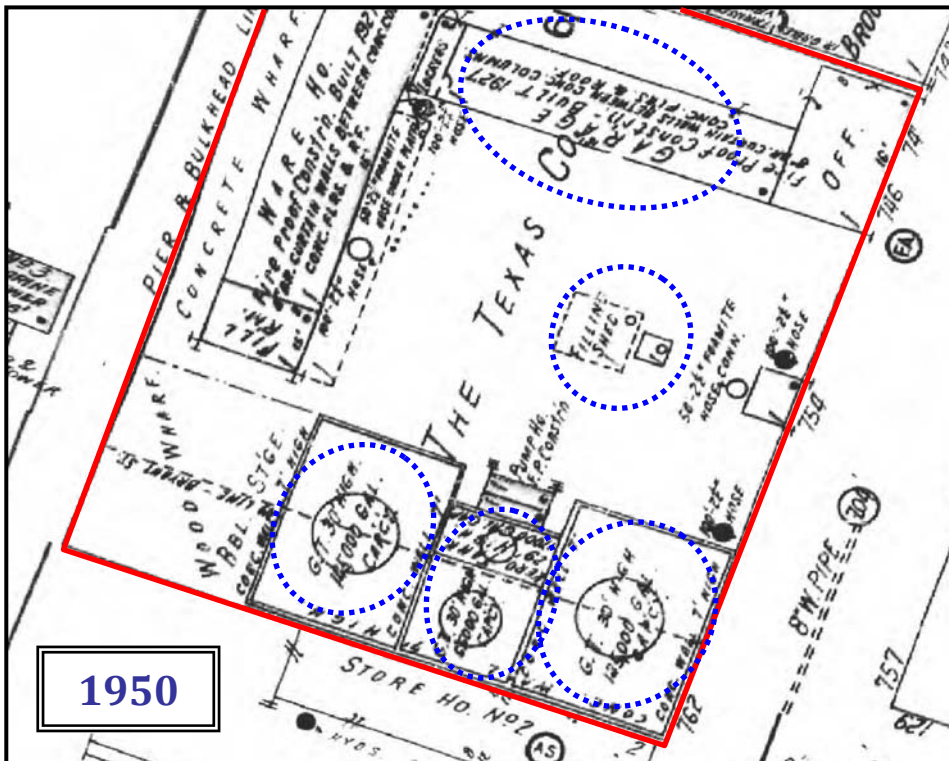
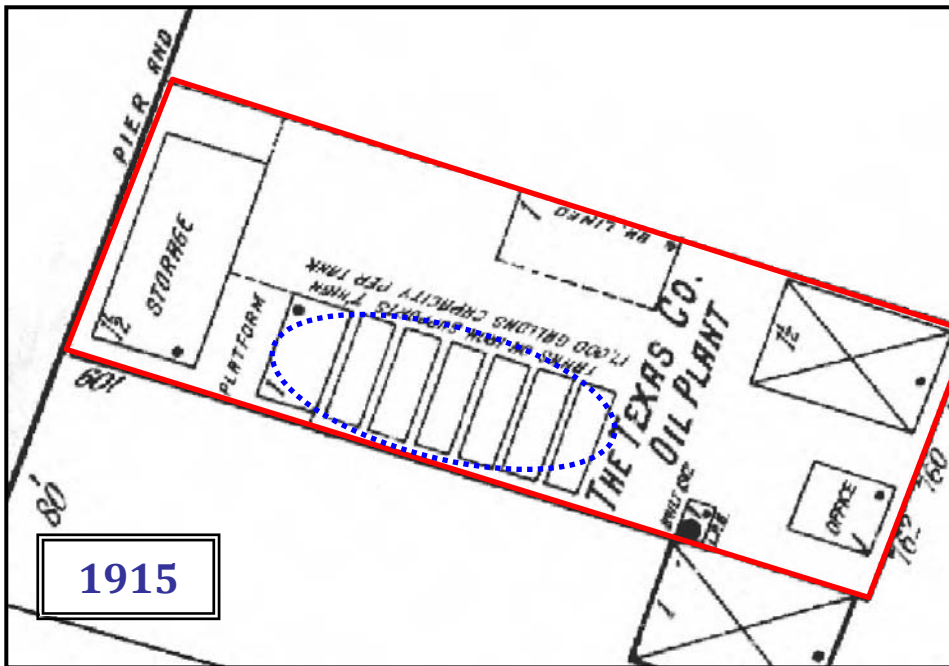


**Site No. 23 - Texas Company/Chervon Texaco
744 Clinton Street**

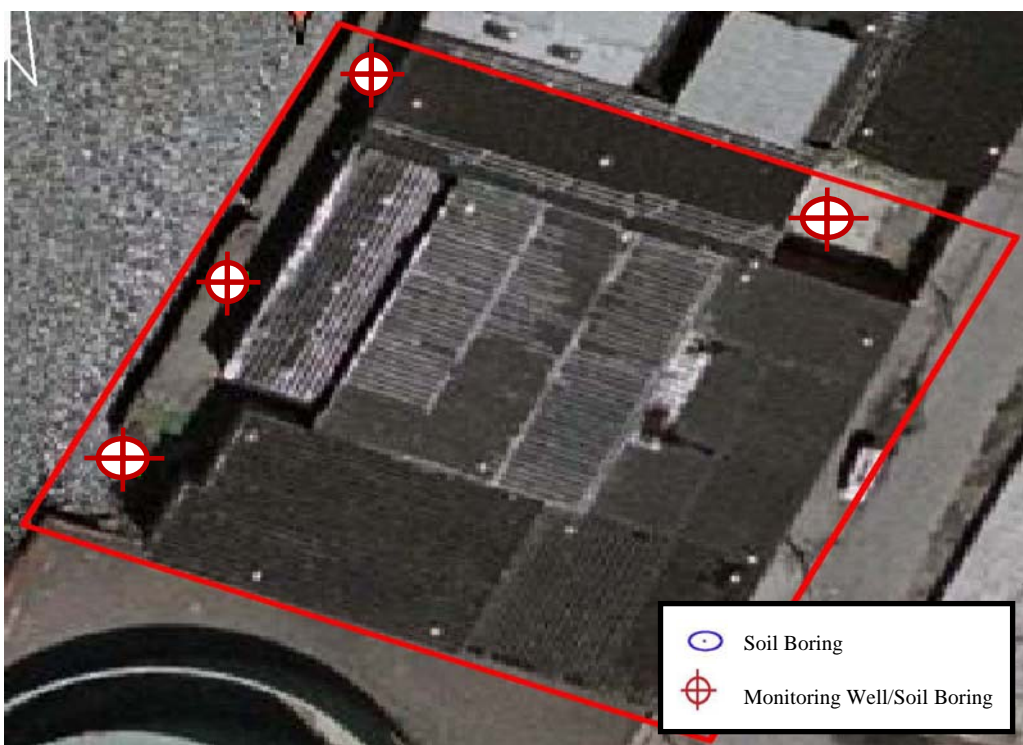
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1904	Milliken Brothers Iron Works – machine shop, offices, pattern shop, punching shop, steel crane track.	Various petroleum products and solvents were probably stored and used at the former iron works.
1915	The Texas Co. Oil Plant – storage, office building, stable building, six tanks on iron supports with 17,000-gallon capacity per tank.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1928-1950	The Texas Company – multiple fuel oil storage tanks with 125,000-gallon to 165-gallon capacity, pump house, filling shed, warehouse, garage, office, wood wharf.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969	All tanks listed as empty; Aid Export Trucking – warehouses, office, garage.	Petroleum products and solvents were probably used at this former trucking company.
1977-1988	Tanks no longer shown (replaced by a warehouse and a building of concrete construction); Aid Export Trucking warehouse.	Petroleum products and solvents were probably used at this former trucking company.
1991-2007	American Stevedoring Ltd. Import-Export Trucking.	Petroleum products and solvents were probably used at this former trucking company.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



**Site No. 24 - Thompson & Co. Coal Yard/Donald & Co. Oil Storage
503 Smith Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

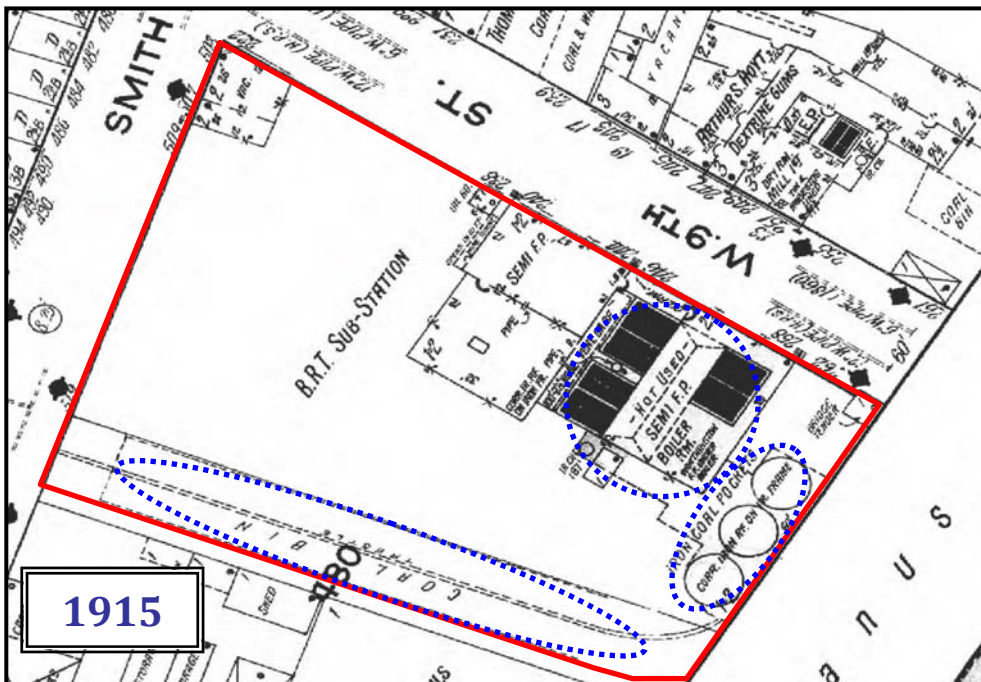
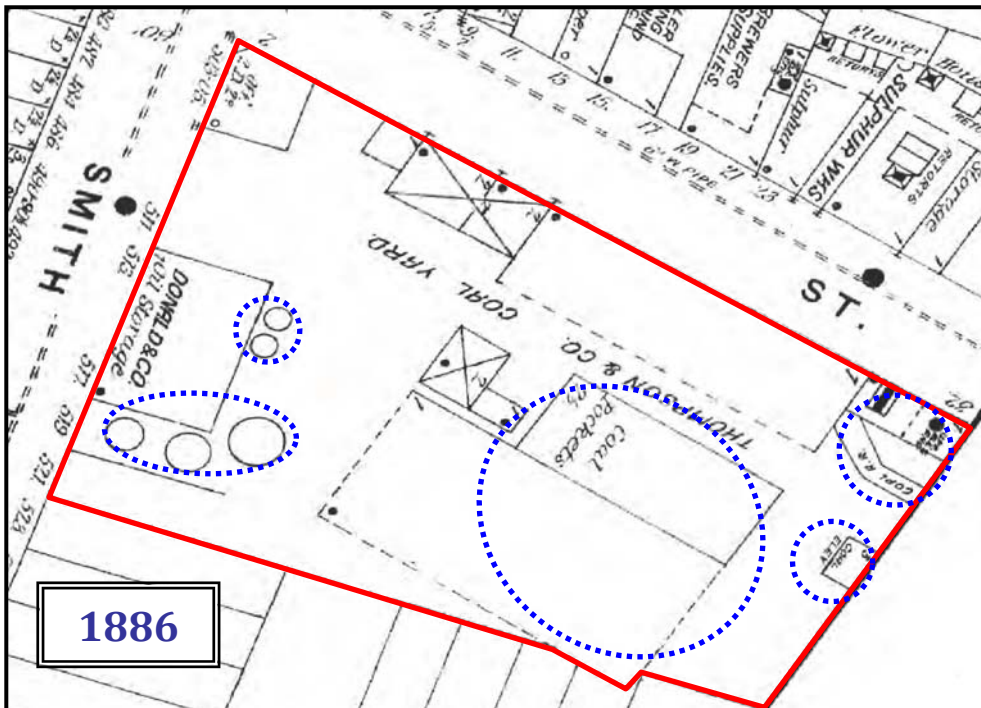
Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Thompson & Co. Coal Yard: Coal Yard and Pockets; Donald & Co. Oil Storage: five tanks of varying sizes.	A large amount of fuel oil and coal was stored and used at this former coal company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	Coney Island & Brooklyn R.R. Companies – Electric Power Station: 3 Iron Coal Pockets, each 60' diameter., 8 hydrants; car barn; repair shop; repair pits.	Various petroleum products, PCB oils, and solvents were probably stored and used at the former power station. Potential contaminants include benzene, PCBs, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915-1928	B.R.T. Substation: three iron coal pockets, each 60' diameter, boiler room.	Various petroleum products, PCB oils, and solvents were probably stored and used at the former power station. Potential contaminants include benzene, toluene, xylene, phenol, PCBs, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	B.R.T. Substation: two iron coal pockets, each 60' diameter., labeled “not used”, generator room	Various petroleum products, PCB oils, and solvents were probably stored and used at the former power station. Potential contaminants include benzene, toluene, xylene, phenol, PCBs, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

**Thompson & Co. Coal Yard/Donald & Co. Oil Storage
503 Smith Street**

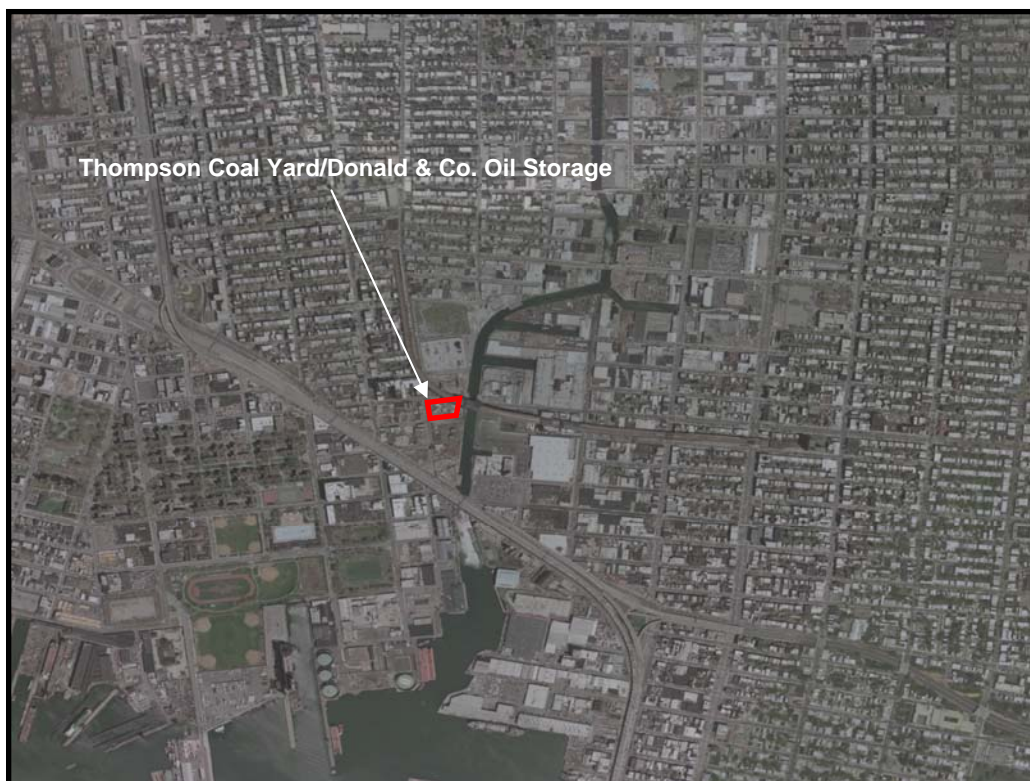
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Crate, marine equipment, and rope storage buildings, auto repair, parking, generator room.	Petroleum products and solvents were probably used during auto repair activities. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-2007	Filling station.	A large amount of fuel oil was stored and used at this former oil company. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



Site No. 25 - Thos Paulson & Son, Inc.
307-325 Bond Street

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

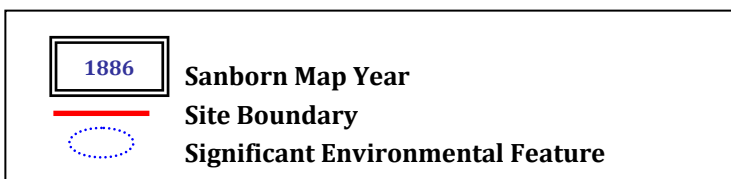
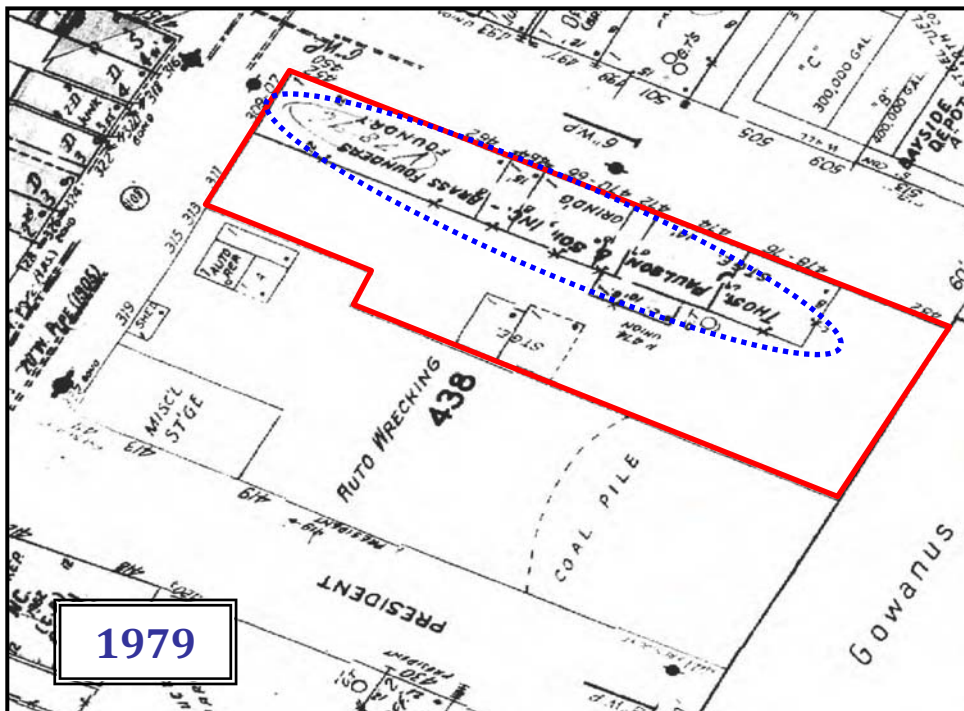
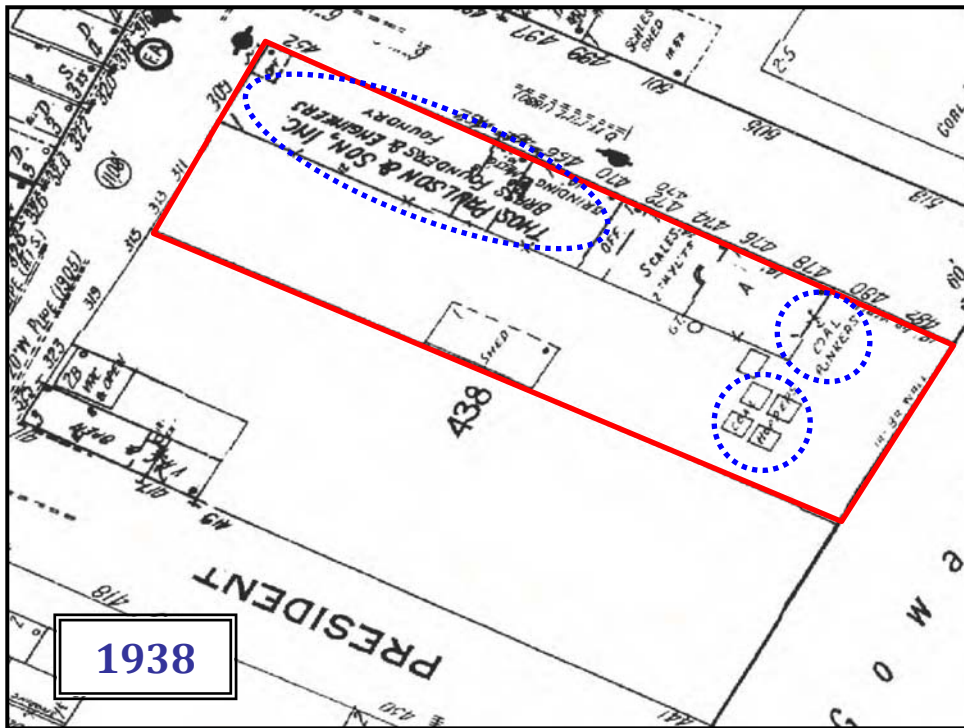
Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	Lidford's Coal & Wood Yard.	A large amount of fuel oil and coal was stored and used at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1904	Lidford's Coal & Wood Yard – coal pockets and coal sheds.	A large amount of fuel oil and coal was stored and used at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1915	T.H. Lidford's Coal and Wood Yard; John Hynes Granite Works (not running).	A large amount of fuel oil and coal was stored and used at this former coal company. Potential contaminants include benzene, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1938	Thos Paulson & Son, Inc. Brass Founders & Engineers: Foundry; coal bunkers, gasoline tank.	Various petroleum products, solvents, and heavy metals could be stored and used at the former foundry. Potential contaminants include zinc, chromium, lead, copper, manganese, methanol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.

Thos Paulson & Son, Inc.
307-325 Bond Street

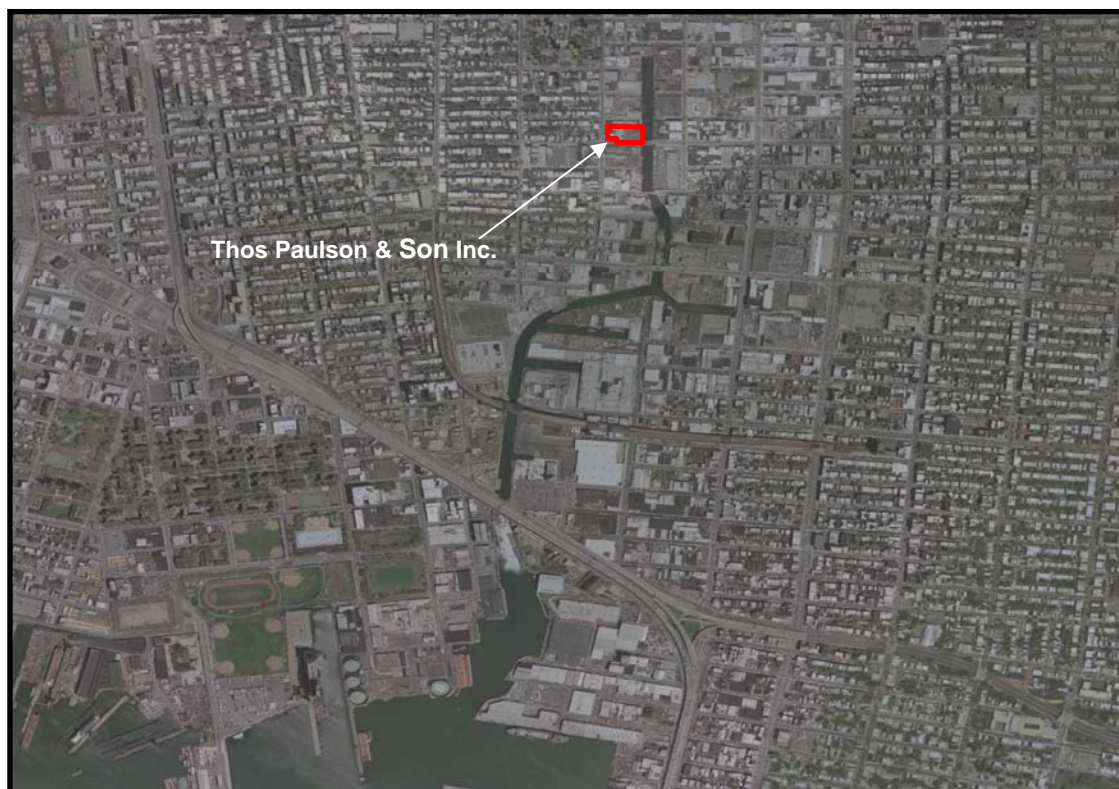
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1950	Thos Paulson & Son, Inc. Brass Founders & Engineers: Foundry; storage and shed buildings.	Various petroleum products, solvents, and heavy metals could be stored and used at the former foundry. Potential contaminants include zinc, chromium, lead, copper, manganese, methanol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1969- 1979	Thos Paulson & Son, Inc. Brass Founders & Engineers: Foundry; storage and shed buildings, and gasoline tank.	Various petroleum products, solvents, and heavy metals could be stored and used at the former foundry. Potential contaminants include zinc, chromium, lead, copper, manganese, methanol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.
1980- 2007	Thos Paulson & Son, Inc. Brass Founders & Engineers: Foundry; storage and shed buildings, and gasoline tank.	Various petroleum products, solvents, and heavy metals could be stored and used at the former foundry. Potential contaminants include zinc, chromium, lead, copper, manganese, methanol, PAHs, sulfuric and other acids, phenol, xylene, and various chlorinated solvents.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



**Site No. 26 - Vidan Auto Salvage
327 Bond Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	John Morton & Sons Lime and Brick Shed; Loomis' Lumber Yard	Petroleum products and solvents were probably used for the machinery at this former mill.
1904	John Morton's Sons Inc. Mason Materials; Newton & Co. lubricating oil; junk yard.	Various petroleum products and solvents were probably used during these former industrial operational.
1938	Garage with three gasoline tanks of unidentified capacity; coal yard; coal pockets.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Crating for Export; coal pockets; gasoline tank; iron works; truck parking; warehouse.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

**Vidan Auto Salvage
327 Bond Street**

**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern**

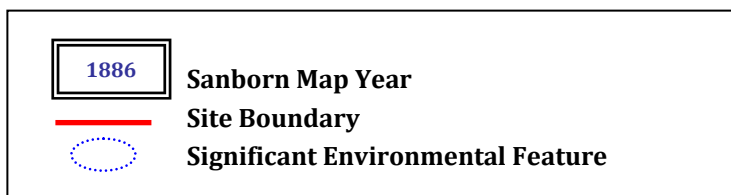
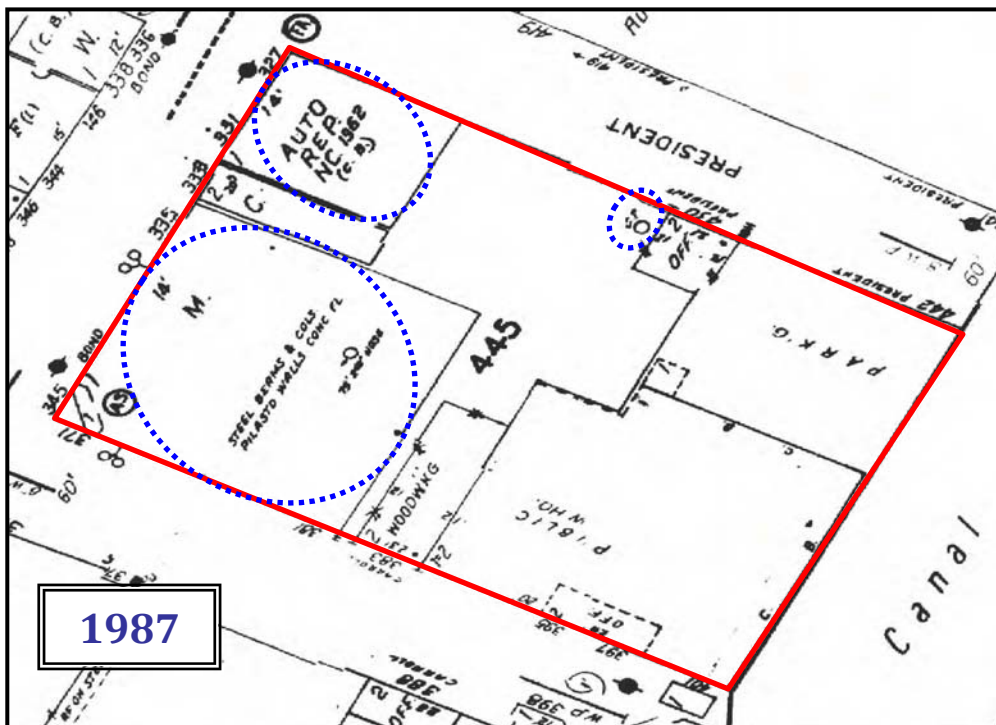
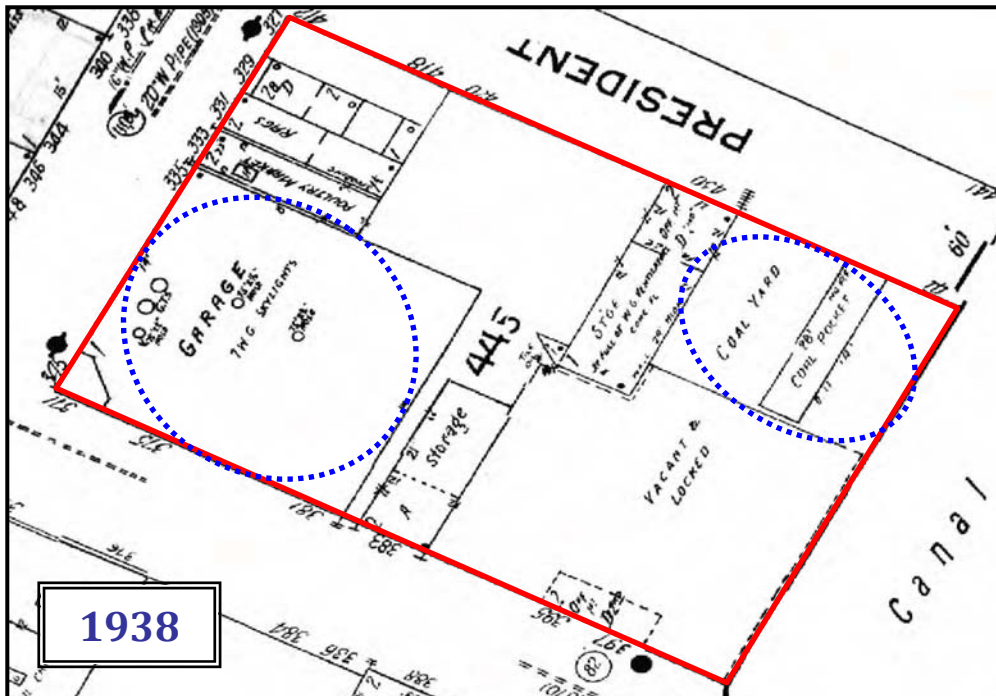
Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1886	John Morton & Sons Lime and Brick Shed; Loomis' Lumber Yard	Petroleum products and solvents were probably used for the machinery at this former mill.
1904	John Morton's Sons Inc. Mason Materials; Newton & Co. lubricating oil; junk yard.	Various petroleum products and solvents were probably used during these former industrial operational.
1938	Garage with three gasoline tanks of unidentified capacity; coal yard; coal pockets.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1950	Crating for Export; coal pockets; gasoline tank; iron works; truck parking; warehouse.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1969-1980	Truck repair; wood working; coal pockets; gasoline tank; truck parking; flat.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

**Vidan Auto Salvage
327 Bond Street**

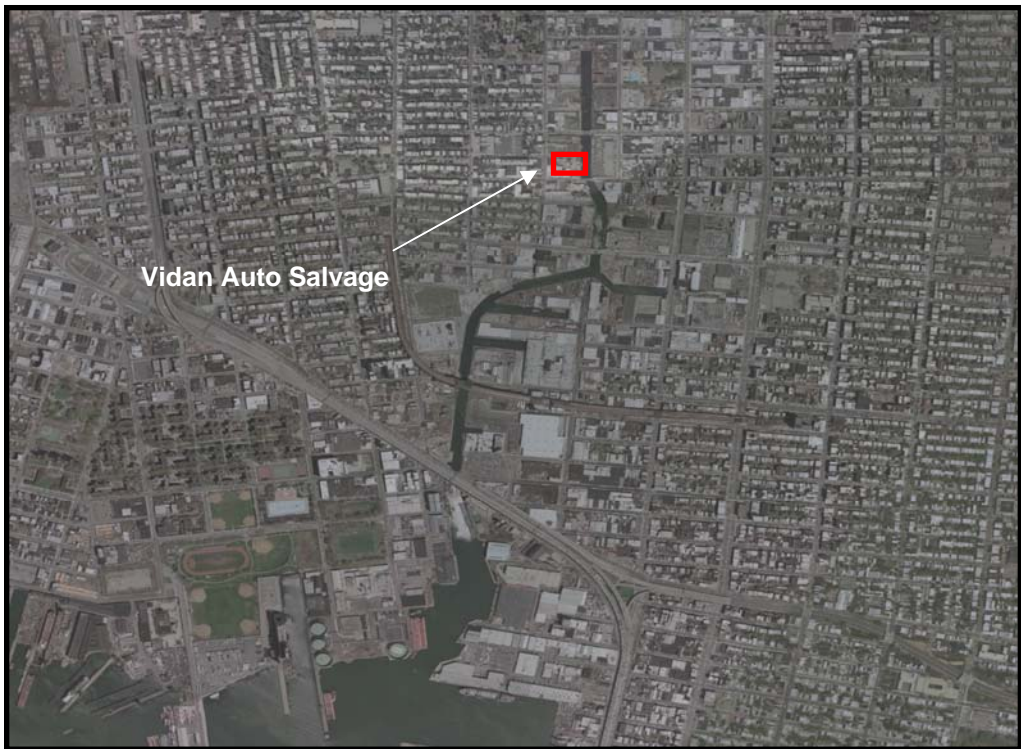
**Sanborn Map Review Industrial Findings
and Associated Potential Environmental Concern (cont'd.)**

Sanborn Map Year	Sanborn Fire Insurance Map Review Industrial Findings	Associated Potential Environmental Concern
1969-1980	Truck repair; wood working; coal pockets; gasoline tank; truck parking; flat.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
1981-1996	Truck/auto repair; wood working; coal pockets; gasoline tank; truck parking; unidentified manufacturing.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.
2001-2007	Car services; wood working; coal pockets; gasoline tank; truck parking.	Various petroleum products and solvents could be stored and used during these former industrial operations. Potential contaminants include benzene, toluene, xylene, phenol, methyl isobutyl ketone, methyl chloroform, ethylene dichloride, methylene chloride, methanol, creosote, lead, mercury, copper, and PAHs.

Examples of Significant Environmental Features in Sanborn Maps



Proposed Well and Boring Locations



2.1.2 NYSDEC Regulated Upland Sites Around Canal

Based on a review of various NYSDEC regulated environmental databases, approximately 25 upland properties located in the immediate vicinity of the Gowanus Canal (within several blocks have been identified. These include projects in the State Superfund program, the Brownfield Cleanup Program (BCP), the Voluntary Cleanup Program (VCP), the spill program, the Petroleum Bulk Storage (PBS) program, the Chemical Bulk Storage (CBS) program, and the Major Oil Storage Facility (MOSF) program. Ongoing discharges of hazardous waste and petroleum products should be considered in the RI/FS for the Gowanus Canal. In addition, this list of regulated sites, at least half of which have been identified as ongoing discharges to the Canal, also should prompt EPA to issue additional letters under section 104(e) to obtain additional information on these sites.

2.1.2.1 NYSDEC State Superfund Sites

The NYS Inactive Hazardous Waste Program, informally known as the NYS Superfund Program, addresses listed properties with disposal of consequential amounts of hazardous waste that pose a significant threat to public health and/or the environment (NYS DEC 2007/2008). This program uses a cleanup process that is similar to Federal Superfund and includes the following activities: initial assessment, RI, FS, proposed remedial action plan, a public meeting and public comment period, a record of decision with a responsiveness summary, remedial design, remedial construction, and long-term site management. Based on current information in the NYSDEC database, the following two State Superfund sites have been identified and their locations are shown in Figure 6.

Fulton Works – Nevins, DeGraw and Sackett Streets

The former Fulton Works MGP site was operated by the Fulton Municipal Gas Company and Brooklyn Union Gas from the late 1800s to approximately the early 1930s. The property was subsequently sold, subdivided and redeveloped for industrial, commercial and recreational uses. In February 2007, NYSDEC conducted an investigation of a portion of the property currently occupied by a City-owned playground. Significant coal tar contamination was detected in soils beneath the site, and extending to the Canal to the west. Groundwater contamination consisting of BTEX, and PAHs was also confirmed. RI activities are ongoing at this property.

Metropolitan MGP – 124-136 2nd Avenue

The Metropolitan MGP site is bordered to the west by the Canal and was used as a MGP from the late 1800s to the 1930s. As a result of these operations, soils and groundwater at the property have been contaminated by BTEX and PAHs, and soils have been heavily contaminated with coal tar. During redevelopment activities at the property in 2000, significant DNAPL/coal tar contamination was found in soil at depths of up to 80 feet bgs. An RI was scheduled to begin in late 2009 under the Brownfield Cleanup Program (BCP).

2.1.2.2 NYSDEC BCP and VCP Sites

The NYS DEC BCP is a voluntary cleanup program designed for the remediation of contaminated properties. Based on current information in the NYSDEC database, the following three sites, and the two aforementioned State Superfund sites, have been included in the BCP and identified in the vicinity of the Gowanus Canal. The former Metropolitan MGP site has also been included in the NYSDEC VCP. Approximated locations of these facilities are shown in Figure 6.

Citizens MGP – Carroll Gardens, 5th Street and Smith Street to Gowanus Canal

The former Carroll Gardens (also known as Public Place) MGP was operated by the Citizens Gas Company and Brooklyn Union Gas from the 1860s to the early 1960s. Extensive environmental investigation indicates that the primary contaminant at this site is DNAPL/coal tar in the soils at depths up to 150 feet bgs with active coal tar seeps into the Gowanus Canal that have been noted during low tide conditions at two locations at least. Other contaminants identified on-site include petroleum, chlorinated solvents, SVOCs, metals, pesticides, PCBs, cyanide and VOCs. Contaminated media in addition to soils include soil gas and groundwater. Implementation of the remedy has reportedly been delayed.

Whole Foods site - 220 3rd Street and 360 3rd Avenue

This property was formerly utilized as coal yards, lumber yards, an ice company, a petroleum company, a building materials company, a trucking company, a freight depot, an automobile junk yard and an automobile repair shop. On March 21, 2005, the 190-220 Third Street Store Brooklyn, LLC entered into a Brownfield Cleanup Agreement with the NYSDEC.

Investigations pursuant to the BCP have identified that subsurface soils, soil gas and groundwater are contaminated as a result of industrial operations and other historic activities.

Gowanus Village I, LLC, 430 Carroll Street/153 2nd Street

This property, located north of the Canal, is currently used for commercial operations. A 24,200-square foot building is located in the eastern portion of the property, while the remainder of the property is vacant. Soil contaminants at the property include PCBs and VOCs. RIs were conducted at the property in 2007.

2.1.2.3 NYSDEC Spill Incidents

The NYSDEC Petroleum Spill Response Program provides response to reports of petroleum spills and requires investigation and remediation of petroleum spills in order to protect public health and the environment. Currently available information in the NYSDEC spill database shows 20 private active spill incidents in close proximity to the Canal. Most of the spills reported were for petroleum products, such as heating oil and motor fuel, as well as dielectric

fluids, and have impacted soil, groundwater, and/or surface water. Table 1 provides details for each of these 20 active spills and Figure 7 shows their approximate locations.

2.1.2.4 NYSDEC Bulk Storage Facilities

NYSDEC Bulk Storage Programs regulate tanks and aim to prevent environmental discharges at facilities storing chemical and petroleum products. These programs include the Petroleum Bulk Storage (PBS) Program, the Chemical Bulk Storage Program (CBS), and Major Oil Storage Facilities (MOSF). For privately owned facilities, there are currently 40 PBS sites, five CBS facilities, and one MOSF in the Gowanus Canal area. Details for each of the PBS facilities are presented in Table 2 and their locations are indicated in Figure 7. Table 3 and Figure 8 show details of the CBS facilities and MOSF.

2.2 PRELIMINARY CONTAMINANT MIGRATION PATHWAY ASSESSMENT

Hazardous waste and petroleum detected in upland soils potentially serve as long-term source areas of contamination to surface water runoff and groundwater discharging into the Canal. For example, once DNAPLs/coal tars in soil encounter groundwater they will partition into dissolved-phase contaminants (for example, VOCs) and depending on site-specific hydrogeology, may also collect as free product within groundwater and pool on and along low-permeability geologic features, such as local layers or lenses of silts or clays. These enclaves of DNAPLs/coal tars have been measured throughout the upland areas and are continuing sources of contamination to upland groundwater, which discharges to the Canal. As DNAPLs/coal tars are also present within the sediments in the Canal and directly below the sediment bed in the native deposits, groundwater discharge (flux) up into the Canal (upward hydraulic head) likely contains dissolved-phase contaminants that could continue to contribute to the sediment contamination. Other geologic factors, such as methane gas generation and upward migration will also play an important role in mobilizing and transporting DNAPL/coal tar into the Canal from enclaves within and below underlying Canal sediment.

In addition, hazardous waste and petroleum sources and associated contaminant transport has been hydraulically influenced in the Gowanus Canal area by historic pumpage of groundwater for potable usage. As described in Section 3.1, reduction in the water table during periods of industrial activity in the area (over 20 feet in certain areas) and associated reversals in groundwater flow patterns would act to spread hazardous waste and petroleum enclaves more deeply and broadly in the local aquifer system. This would result in larger contaminant source areas and a lengthened period of contaminant discharge to the Canal once groundwater withdrawal ceased in the second half of the 20th century.

Other mechanisms of hazardous waste and petroleum migration from upland industrial properties include, but are not limited to: (1) continued releases of solid phase contaminant enclaves that

have built up in unpermitted drainage systems to the Canal during earlier periods of industrial operation; (2) mobilization of contaminated surface soil and fill by sheet flow during rainfall events; and (3) erosion of contaminated soils along degraded bulkheads lining the Canal.

As has been established, the contaminants detected in the Canal sediments, such as petroleum-based hydrocarbons, DNAPL/coal tars, VOCs, SVOCs, PAHs and metals, did not originate from the Canal, and are largely attributable to industrial activities in the surrounding upland industrial area. In order to appropriately address these ongoing hazardous waste and petroleum source areas, the CSM and RI Report for Gowanus Canal must consider and address the after mentioned contaminant discharge mechanisms from upland industrial properties.

3. RECOMMENDATIONS FOR UPLAND RI / HYDROGEOLOGIC STUDY AND CSM

The following summarizes the central findings of the City's evaluation of hydrogeology and the upland industrial properties in the vicinity of the Gowanus Canal:

- The aquifer system is porous and will readily transport hazardous waste and petroleum migrating from contaminated enclaves on industrial properties in the surrounding watershed.
- Groundwater flow and surface water flow in the surrounding industrial watershed discharges to the Gowanus Canal.
- Over 650 industrial properties exist in the vicinity of the Gowanus Canal and many have had industrial operations that pre-date 1900.
- Most industrial activities predate promulgation of environmental regulations, and the transport, storage and disposal of hazardous waste and petroleum did not observe modern protection practices. To the contrary, intentional land disposal of hazardous wastes and petroleum and other unintentional releases from storage and transport activities were commonplace.
- There is extensive evidence of environmental impact of land disposal and spill of hazardous waste and petroleum on industrial properties in the watershed. However, only a relatively small number of industrial properties in the watershed have been investigated to date.
- Compared to the total number of industrial properties in the watershed, relatively few properties have been cleaned up in governmental remedial programs.
- The Gowanus Canal is not the origin of the contamination in canal sediments. Contaminants in the Gowanus Canal sediments are derived mainly from direct and indirect discharges from surrounding industrial properties.
- Approximately 25 industrial and other properties in the vicinity of the Gowanus Canal have known contamination and are currently in governmental regulatory programs. Cleanup on most of these properties have not yet been completed.
- A review of historical fire insurance maps and other sources has identified 26 additional industrial properties with a high potential for continued discharges of hazardous waste and/or petroleum to the Gowanus Canal. Many more are likely to have contamination that has not yet been identified.

- EPA guidance for remediation of contaminated sediment recommends:
 - Development of a CSM and establishment of DQOs as a means to guide upland site investigation and decision making.
 - Identification of all significant ongoing upland industrial sources of contamination discharges during the RI and prior to selection of a remedial action.
 - Evaluation of significant ongoing industrial discharges in order to determine the need for control of discharges to prevent recontamination of sediment and associated threats to the final Canal remedial actions.
 - Implementation of controls for significant ongoing industrial discharges prior to implementation of the remedial action for the sediment.

Based on the City's review, findings and preliminary contaminant migration pathway assessment presented for the Canal and adjacent upland areas, the City's recommends a comprehensive and targeted study of ongoing discharges of hazardous waste and petroleum from upland industrial properties consistent with EPA's guidance for contaminated sediment remediation for hazardous waste sites (EPA, 2005).

The City recommends that EPA's draft MWIP be amended to include the following:

- EPA should develop of DQOs and a CSM for the Gowanus Canal and upland areas that incorporates all known and suspected ongoing sources of hazardous waste and petroleum from upland industrial properties, types of contaminants and affected media, fate and transport mechanisms, existing and potential exposure pathways, and the known or potential human and ecological receptors.
- EPA should expand the Upland RI/Hydrogeologic Study to identify and assess all upland properties with high potential to be ongoing sources of contamination to the Gowanus Canal, with investigations appropriately biased to identify contaminant source areas on these properties. Specific recommendations are provided in Section 2.1.1 for the 26 sites identified.
- EPA should perform site reconnaissance and environmental investigation of each upland industrial property to further identify source areas and ongoing hazardous waste and petroleum discharges to the Canal.
- EPA should expand the Upland RI/Hydrogeologic Study to delineate the hydrogeologic flow regime for the entire industrial portion of the upland area to more fully define the groundwater contaminant migration pathways from industrial properties to the Canal.
- EPA should develop a strategic monitoring well installation plan that is focused on the most impacted upland areas to delineate DNAPL/coal tar, hazardous waste, and high concentrations of associated dissolved-phase contamination.
- EPA should conduct soil borings on identified upland properties to and below the current elevation of the water table to identify stained soils or zones that are contaminated with

hazardous wastes, LNAPL, sheens, DNAPLs/coal tars and residual petroleum free product.

- Soil samples should be collected and analyzed to document the nature and extent of grossly contaminated soil in each zone encountered.
 - Deep soil sampling should be conducted below the water table to identify DNAPL/coal tar contamination.
- EPA should use the results of the proposed soil borings and sample analysis to develop detailed mapping of the subsurface hydrostratigraphy and potential hazardous waste and petroleum source zones with the objective of prioritizing and targeting the most significant contaminant zones in a subsequent groundwater sampling and analysis program.
- EPA should conduct visual reconnaissance along each bank of the Gowanus Canal at low tide (and preferably just after a rain event) to identify locations of groundwater seeps that are discharging to the Canal from the bulkhead or rip rap areas.
- EPA should assess the potential for future recontamination of Canal sediments by each ongoing hazardous waste or petroleum discharge.
- EPA should assess the risks to human health and the ecological receptors considering the potential end-use of the Site and surrounding upland areas. EPA should also determine which ongoing discharges must be controlled (i.e. those that have the potential to recontaminate the Canal).

4. REFERENCES

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TABLES

Table 1 - NYSDEC Active Spill Incidents Near Gowanus Canal

MAP #	SPIILL NO	FACILITY	ADDRESS	LOCALITY	SPIILL DATE	MATERIAL SPILLED	QUANTITY	IMPACTED MEDIA	CAUSE
#01	0500510	WAREHOUSE - MISC	627-641 SMITH ST	BROOKLYN	04/12/05	UNKNOWN PETROLEUM	UNKNOWN	Groundwater	Unknown
#02	9106263	BAY SIDE FUEL (FORMER CIBRO TERMINALS)	537 SMITH STREET	BROOKLYN	09/10/91	#6 Fuel Oil	UNKNOWN	Soil	Equipment Failure
#03	0407393	365 BOND STREET	365 BOND STREET	BROOKLYN	10/04/04	UNKNOWN PETROLEUM	UNKNOWN	Groundwater	Other
#04	0603334	CONSTRUCTION SITE	198 DOUGLASS ST	BROOKLYN	06/02/06	UNKNOWN MATERIAL	UNKNOWN	Groundwater	Unknown
#05	0903590	COSMOC INC	255 BUTLER STREET	BROOKLYN	06/26/09	Other	UNKNOWN	Unknown	Equipment Failure
#06	9607280	FORMER GAS STATION	156-170 3RD AVENUE	BROOKLYN	08/19/96	Gasoline	UNKNOWN	Soil	Unknown
#07	9412605	BRUCE RIBELNON OMNI MALL	473 PRESIDENT ST	BROOKLYN	12/20/94	UNKNOWN PETROLEUM	UNKNOWN	Soil	Tank Test Failure
#08	9207367	VERIZON	318 NEVINS STREET	BROOKLYN	09/24/92	Gasoline	UNKNOWN	Groundwater	Unknown
#09	9603998	MCIZ CORP	1-25 2ND AVE	BROOKLYN	06/24/96	Diesel	UNKNOWN	Soil	Tank Test Failure
#10	8908697	KENTILE FLOORS	58 2ND AVENUE	BROOKLYN	12/04/89	UNKNOWN PETROLEUM	UNKNOWN	Soil	Housekeeping
#11	8809911	498 3RD AVENUE	498 3RD AVENUE	BROOKLYN	03/14/89	Gasoline	UNKNOWN	Groundwater	Tank Test Failure
#12	0809566	HOUR CHILDREN	36-11 12TH ST	BROOKLYN	11/24/08	#2 Fuel Oil	UNKNOWN	Groundwater	Unknown
#13	0903128	TRANSCARE AMBULANCE	25 14TH ST	BROOKLYN	06/16/09	Diesel	13.00 Gal.	Soil, Sewer	Human Error
#14	0304044	651 COURT ST	651 COURT ST	BROOKLYN	07/17/03	TAR	2.00 Gal.	Soil	Deliberate
#15	0907423	MOBIL STATION #10464	375 HAMILTON AVE	BROOKLYN	BROOKLYN	UNKNOWN PETROLEUM	UNKNOWN	Soil	Other

Table 2 - NYSDEC CBS Facilities and MOSF Near Gowanus Canal

MAP #	Site No.	Status	Expiration Date	Site Type	Site Name	Address	Locality	State	Zipcode	County
#1	2-000136	Admin. Closed	12/08/99	CBS	DOUGLAS & DEGRAW	NEVINS ST, DOUGLAS ST., 3 AVE	Brooklyn	NY	11215	Kings
#2	2-000126	Unregulated	07/18/99	CBS	WESLEY LACQUER CORP.	95 FOURTH ST	Brooklyn	NY	11231	Kings
#3	2-000417	Unregulated	07/06/07	CBS	PEP BOYS #0247	354 4TH AVE	Brooklyn	NY	08030	Kings
#4	2-000096	Unregulated	07/07/01	CBS	WITCO CORPORATION (POLYMER ADDITIVES GROUP)	700 COURT STREET	Brooklyn	NY	11231	Kings
#5	2-000355	Active	06/10/11	CBS	HESS CORP.-BROOKLYN TERMINAL	722 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0156	Active	03/31/08	MOSF	Energy 9801	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0647	Active	03/31/13	MOSF	Energy 6505	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0952	Active	03/31/13	MOSF	Energy 11105	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0944	Active	03/31/13	MOSF	Energy 13501	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0842	Active	03/31/13	MOSF	Energy 6501	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0594	Active	03/31/13	MOSF	Energy 11101	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0677	Active	03/31/13	MOSF	Energy 11102	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0920	Active	03/31/13	MOSF	Energy 5501	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0773	Active	03/31/08	MOSF	Energy 9501	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0977	Active	03/31/13	MOSF	Energy 6508	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0976	Active	03/31/13	MOSF	Energy 6507	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0953	Active	03/31/13	MOSF	Energy 13502	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0975	Active	03/31/13	MOSF	Energy 6506	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0670	Active	03/31/13	MOSF	Energy 6504	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0951	Active	03/31/13	MOSF	Energy 11104	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0919	Active	03/31/13	MOSF	Energy 7001	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0151	Active	03/31/13	MOSF	Energy 2201	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0930	Active	03/31/13	MOSF	Energy 6502	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0947	Active	03/31/13	MOSF	Energy 11103	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0921	Active	03/31/13	MOSF	Energy 7002	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0931	Active	03/31/13	MOSF	Energy 8001	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0648	Active	03/31/13	MOSF	Energy 8701	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings
#6	0-0152	Active	03/31/08	MOSF	Energy 2202	MARINE TANK BARGE OPERATING OUT OF: 671 COURT STREET	Brooklyn	NY	11231	Kings

Table 3 - NYSDEC PBS Facilities Near Gowanus Canal

MAP #	PBS #	Site Name	Address	Tank ID	Tank Number	Tank Location	Tank Status	Installation Date	Capacity (Gallons)	Tank Type	Expiration Date
#01	2-608297	168 DOUGLASS STREET	168 DOUGLASS STREET	65004	001	5	2		2000	01	
#02	2-608855	233 BUTLER ST	233 BUTLER STREET	65879	001	5	4		2500	01	
#03	2-295329	255 BUTLER LLC	255 BUTLER STREET	12079	001	1	1		9000	01	
#03	2-295329	255 BUTLER LLC	255 BUTLER STREET	12080	002	1	1		550	01	
#04	2-611037	NEVINS STREET SUBSTATION	223 NEVINS STREET				Unregulated				03/20/12
#05	2-480657	160 3RD AVENUE	160 3RD AVENUE	41118	001	5	6		2200	01	
#06	2-399760	PETROLEUM TANK CLEANERS INC	236 BUTLER ST	21665	005	3	1	12/01/85	7000	01	
#06	2-399760	PETROLEUM TANK CLEANERS INC	236 BUTLER ST	21662	002	5	1	11/16/84	10000	01	
#06	2-399760	PETROLEUM TANK CLEANERS INC	236 BUTLER ST	21664	004	5	2	11/16/84	20000	01	
#06	2-399760	PETROLEUM TANK CLEANERS INC	236 BUTLER ST	21661	001	5	1	12/01/85	3000	01	
#06	2-399760	PETROLEUM TANK CLEANERS INC	236 BUTLER ST	21663	003	5	1	11/16/84	10000	01	
#07	2-609478	SANITATION REPAIRS, INC.	234 BUTLER STREET	178261	#2	1	1	02/01/04	275	01	
#07	2-609478	SANITATION REPAIRS, INC.	234 BUTLER STREET	178260	#1	3	1	02/01/04	550	01	
#07	2-609478	SANITATION REPAIRS, INC.	234 BUTLER STREET	178262	#3	1	1	02/01/04	275	01	
#08	2-017574	BAYSIDE FUEL OIL CORP	267 BOND STREET	53548	016	1	1	08/01/85	275	01	
#08	2-017574	BAYSIDE FUEL OIL CORP	267 BOND STREET	227747	OBF2	3	1	01/01/85	275	01	
#08	2-017574	BAYSIDE FUEL OIL CORP	267 BOND STREET	27061	014	1	1	08/01/85	275	01	
#08	2-017574	BAYSIDE FUEL OIL CORP	267 BOND STREET	227746	OBF1	3	1	01/01/85	275	01	
#08	2-017574	BAYSIDE FUEL OIL CORP	267 BOND STREET	27062	015	1	1	08/01/85	275	01	
#09	2-017590	BAYSIDE FUEL OIL	498-502 SACKETT STREET 498 SACKETT STREET	227669	OBF4	3	1	01/01/85	275	01	
#09	2-017590	BAYSIDE FUEL OIL	498-502 SACKETT STREET 498 SACKETT STREET	227670	OBF5	3	1	01/01/85	275	01	
#10	2-483001	ADMIRAL METALS	270 NEVINS STREET	55194	002	1	1	08/01/98	5000	01	
#11	2-605467	ADAMS BOOK CO. INC.	537 SACKETT ST				Active				03/21/11
#12	2-604492	A & A BRAKE CO INC	560 SACKETT STREET	233064	002	2	1	04/17/09	275	01	
#13	2-608359	543 UNION STREET	543 UNION STREET CORNER NEVINS STREET	65076	001	1	1	04/21/05	3000	01	
#14	2-005428	REGENCY SERVICE CARTS INC	337 CARROLL ST	26809	001	4	1		8000	01	
#15	2-344265	Verizon New York Inc-NY-35570	318 NEVINS STREET				Active				12/14/12
#16	2-608461	276 3RD AVENUE	276 3RD AVENUE	65196	001	1	1		2000	01	
#17	2-344133	Verizon New York Inc-NY-35549	175 THIRD STREET 175 3RD STREET				Active				12/14/12
#18	2-610369	220 3RD STREET	220 3RD STREET	213991	4	5	2	01/01/69	550	ZZ	
#18	2-610369	220 3RD STREET	220 3RD STREET	213993	5	5	2	01/01/69	550	ZZ	
#18	2-610369	220 3RD STREET	220 3RD STREET	213992	4A	5	2	01/01/69	150	ZZ	

Table 3 - NYSDEC PBS Facilities Near Gowanus Canal

MAP #	PBS #	Site Name	Address	Tank ID	Tank Number	Tank Location	Tank Status	Installation Date	Capacity (Gallons)	Tank Type	Expiration Date
#19	2-306266	ST MARY STAR OF THE SEA RC CHURCH	467 COURT ST	44244	002	1	1		1000	01	
#19	2-306266	ST MARY STAR OF THE SEA RC CHURCH	467 COURT ST	44245	003	1	1		500	01	
#19	2-306266	ST MARY STAR OF THE SEA RC CHURCH	467 COURT ST	16417	001	5	1		2500	01	
#20	2-061093	505 COURT	505 COURT STREET	2094	001	5	1	01/01/18	10000	01	
#21	2-606452	HUNT LOFT LLC	204 HUNTINGTON STREET	61455	01	3	1	01/01/01	4000	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35244	010	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35236	002	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35246	012	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35235	001	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35238	004	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35239	005	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35241	007	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35243	009	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35237	003	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35245	011	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35240	006	5	6		550	01	
#22	2-356883	NORTHVILLE	519 SMITH ST	35242	008	5	6		550	01	
#23	2-157643	EXXONMOBIL R/S #10464	375 HAMILTON AVE	45460	009	5	1	01/01/93	4000	06	
#23	2-157643	EXXONMOBIL R/S #10464	375 HAMILTON AVE	45462	011	5	1	01/01/93	4000	06	
#23	2-157643	EXXONMOBIL R/S #10464	375 HAMILTON AVE	45463	012	5	1	01/01/93	4000	06	
#23	2-157643	EXXONMOBIL R/S #10464	375 HAMILTON AVE	45459	008	5	1	01/01/93	4000	06	
#23	2-157643	EXXONMOBIL R/S #10464	375 HAMILTON AVE	45461	010	5	1	01/01/93	4000	06	
#24	2-483109	610 SMITH STREET	610 SMITH STREET	32324	001	1	1		5000	01	
#25	2-330043	BRKLYN UNION/RED HOOK SATELLITE	651 COURT ST	20208	367	5	6		2000	01	
#25	2-330043	BRKLYN UNION/RED HOOK SATELLITE	651 COURT ST	20212	H18	5	4		55	01	
#25	2-330043	BRKLYN UNION/RED HOOK SATELLITE	651 COURT ST	20210	004	5	6		550	01	
#25	2-330043	BRKLYN UNION/RED HOOK SATELLITE	651 COURT ST	20211	H17	5	4		55	01	
#25	2-330043	BRKLYN UNION/RED HOOK SATELLITE	651 COURT ST	20209	368	5	6		2000	01	
#26	2-600166	JETRO CASH & CARRY	566 HAMILTON AVENUE	41394	#2	5	4		4000	01	
#26	2-600166	JETRO CASH & CARRY	566 HAMILTON AVENUE	41393	#1	5	4		4000	01	

Table 3 - NYSDEC PBS Facilities Near Gowanus Canal

MAP #	PBS #	Site Name	Address	Tank ID	Tank Number	Tank Location	Tank Status	Installation Date	Capacity (Gallons)	Tank Type	Expiration Date
#27	2-601302	BRUNO TRUCK SALES CORP	435 HAMILTON AVENUE	45392	003	5	1	01/01/93	1000	01	
#27	2-601302	BRUNO TRUCK SALES CORP	435 HAMILTON AVENUE	45390	001	5	1	01/01/93	1000	01	
#27	2-601302	BRUNO TRUCK SALES CORP	435 HAMILTON AVENUE	45394	005	5	2	01/01/93	4000	04	
#27	2-601302	BRUNO TRUCK SALES CORP	435 HAMILTON AVENUE	45391	002	5	1	01/01/93	1000	01	
#27	2-601302	BRUNO TRUCK SALES CORP	435 HAMILTON AVENUE	45393	004	5	2	01/01/93	4000	04	
#28	2-246700	BROOKLYN 13TH ST HOLDING CORP	126 13TH ST	10596	001	1	4	12/01/52	3000	01	
#29	2-606174	CARISMA INC.	538 3RD AVENUE 538 THIRD AVE	61042	001	1	1		275	01	
#30	2-602127	THIRD AVENUE PETROLEUM	534-538 THIRD AVENUE 534 THIRD AVENUE	49261	003	5	1	09/01/87	4000	01	
#30	2-602127	THIRD AVENUE PETROLEUM	534-538 THIRD AVENUE 534 THIRD AVENUE	49260	002	5	1	09/01/87	4000	01	
#30	2-602127	THIRD AVENUE PETROLEUM	534-538 THIRD AVENUE 534 THIRD AVENUE	49262	004	5	1	09/01/87	4000	01	
#30	2-602127	THIRD AVENUE PETROLEUM	534-538 THIRD AVENUE 534 THIRD AVENUE	49259	001	5	1	09/01/87	4000	01	
#31	2-608425	CAMRO METAL PRODUCTS INC	127 12 STREET	65152	127120	3	1	01/02/65	4000	01	
#32	2-456063	DSNY BK DISTRICT 6 GARAGE	129 2ND AVENUE A/K/A 127 2ND AVENUE	36484	008	5	1	07/01/02	6000	10	
#33	2-452440	LOWES OF BROOKLYN # 1674	118 2ND AVENUE	224154	01	2	1	03/10/04	1500	01	
#34	2-283924	FRI REALTY CORP	179 NO 10 ST				Unregulated				07/14/97
#35	2-218839	AMERICAN TUBECRAFT PLATING	85 2ND AVE	24050	001	1	1		4500	01	
#36	2-199133	ACHIM IMPORTING CO.	58 SECOND AVENUE 58 2ND AVENUE	12436	002	5	6	12/01/47	1500	01	
#36	2-199133	ACHIM IMPORTING CO.	58 SECOND AVENUE 58 2ND AVENUE	12438	004	5	6	12/01/47	1000	01	
#36	2-199133	ACHIM IMPORTING CO.	58 SECOND AVENUE 58 2ND AVENUE	12437	003	5	6	12/01/47	1500	01	
#37	2-607807	PRIVATE TRAILS	33 2ND AVE	63549	001	3	1	02/01/02	4000	08	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	62394	A	1	1	06/01/98	550	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	36514	013	5	3		275	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	36509	008	5	3		550	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	36511	010	5	3		275	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	62396	C	1	1	06/01/98	550	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	36513	012	5	3		550	01	

Table 3 - NYSDEC PBS Facilities Near Gowanus Canal

MAP #	PBS #	Site Name	Address	Tank ID	Tank Number	Tank Location	Tank Status	Installation Date	Capacity (Gallons)	Tank Type	Expiration Date
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	62395	B	1	1	06/01/98	550	01	
#38	2-456101	MCIZ CORP.	15 2ND AVENUE 15 SECOND AVENUE	36515	014	5	3		10000	01	
#39	2-001694	WALTER UMLA LBR DIV OF DYKES	180 6TH STREET	17979	002	5	1	09/01/66	550	01	
#39	2-001694	WALTER UMLA LBR DIV OF DYKES	180 6TH STREET	17978	001	5	6	08/01/75	4000	01	
#40	2-600004	SUNSET PARK MANUFACTURING & DESIGN CENTER LLC	168 7TH STREET	178339	002	3	1		7500	01	
#40	2-600004	SUNSET PARK MANUFACTURING & DESIGN CENTER LLC	168 7TH STREET	39939	001	5	4		10000	01	

Tank Location

1. Aboveground - contact with soil
2. Aboveground - contact with impervious barrier
3. Aboveground on saddles, legs, stilts, rack, or cradle
4. Aboveground with 10% or more below ground
5. Underground
6. Aboveground in Subterranean Vault w/access for inspections

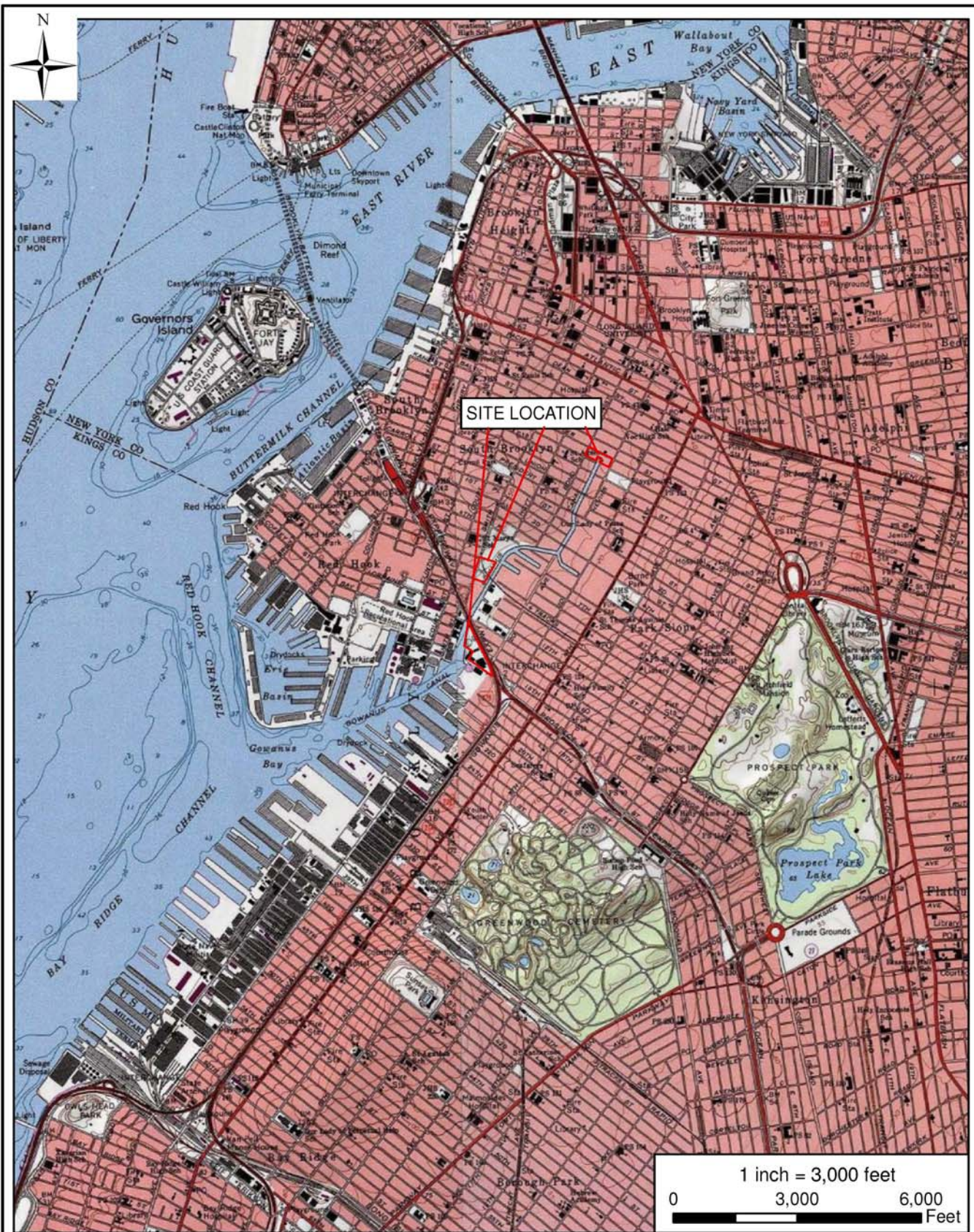
Tank Location

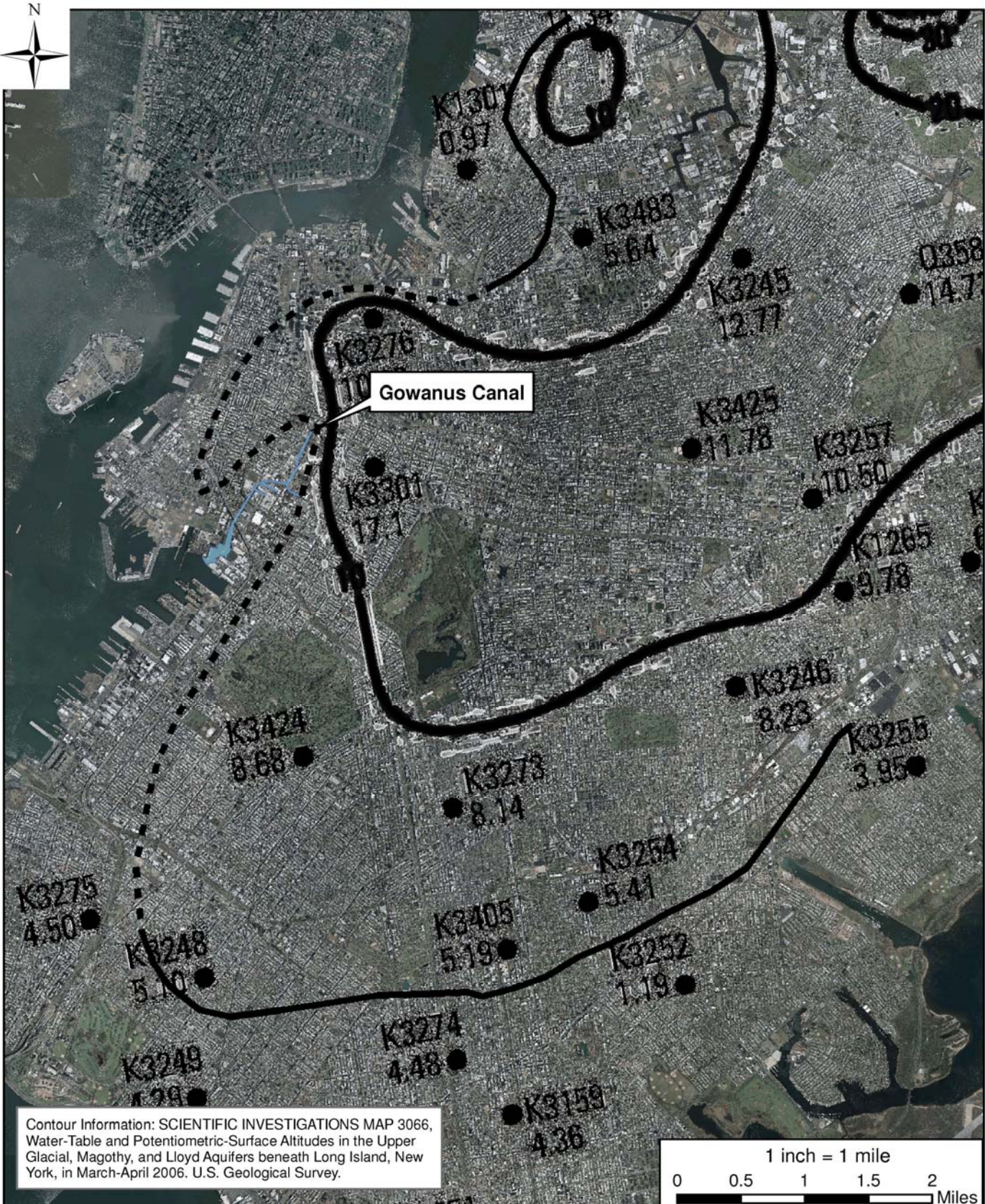
1. Aboveground - contact with soil
2. Aboveground - contact with impervious barrier
3. Aboveground on saddles, legs, stilts, rack, or cradle
4. Aboveground with 10% or more below ground
5. Underground
6. Aboveground in Subterranean Vault with access for inspections

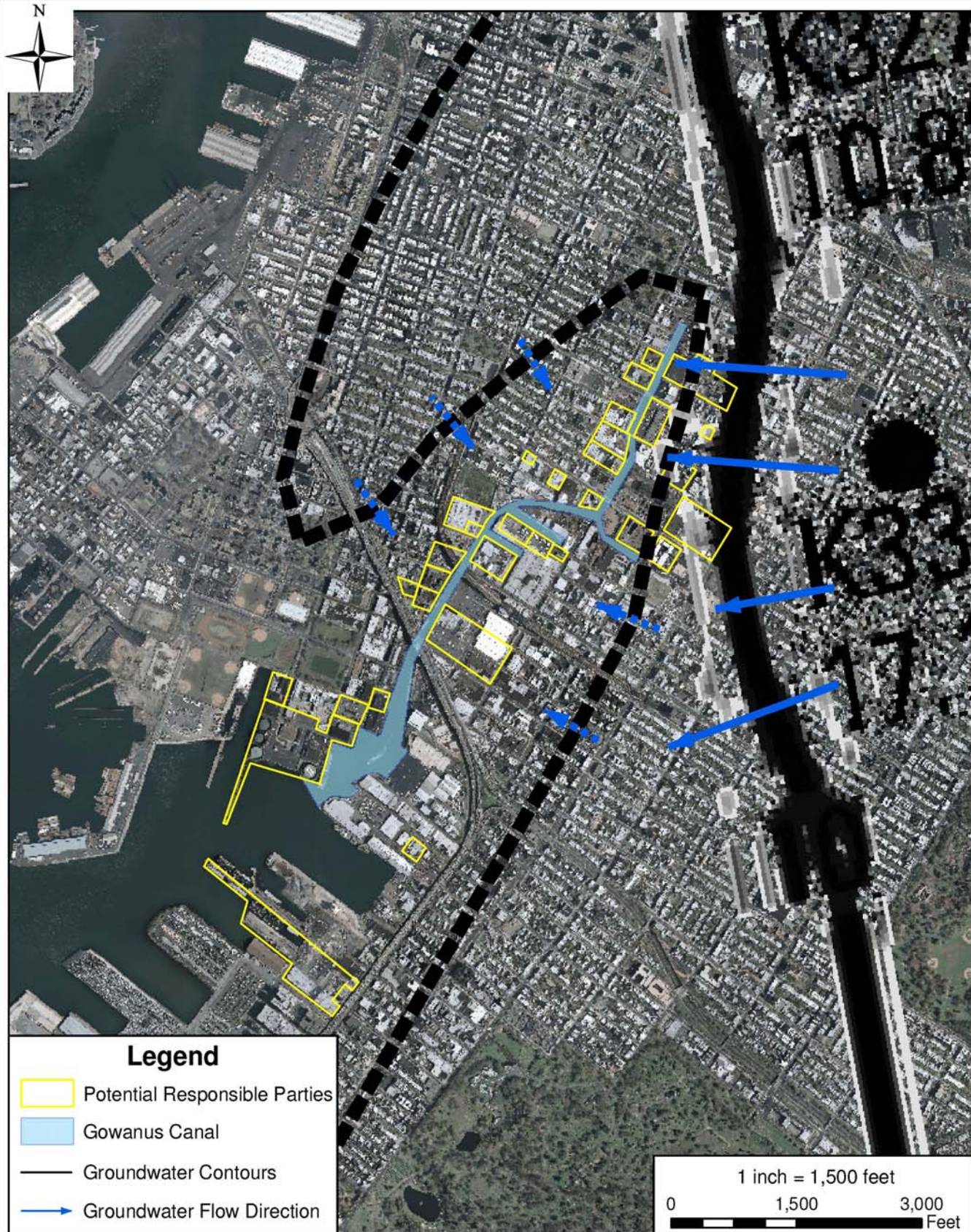
Tank Type

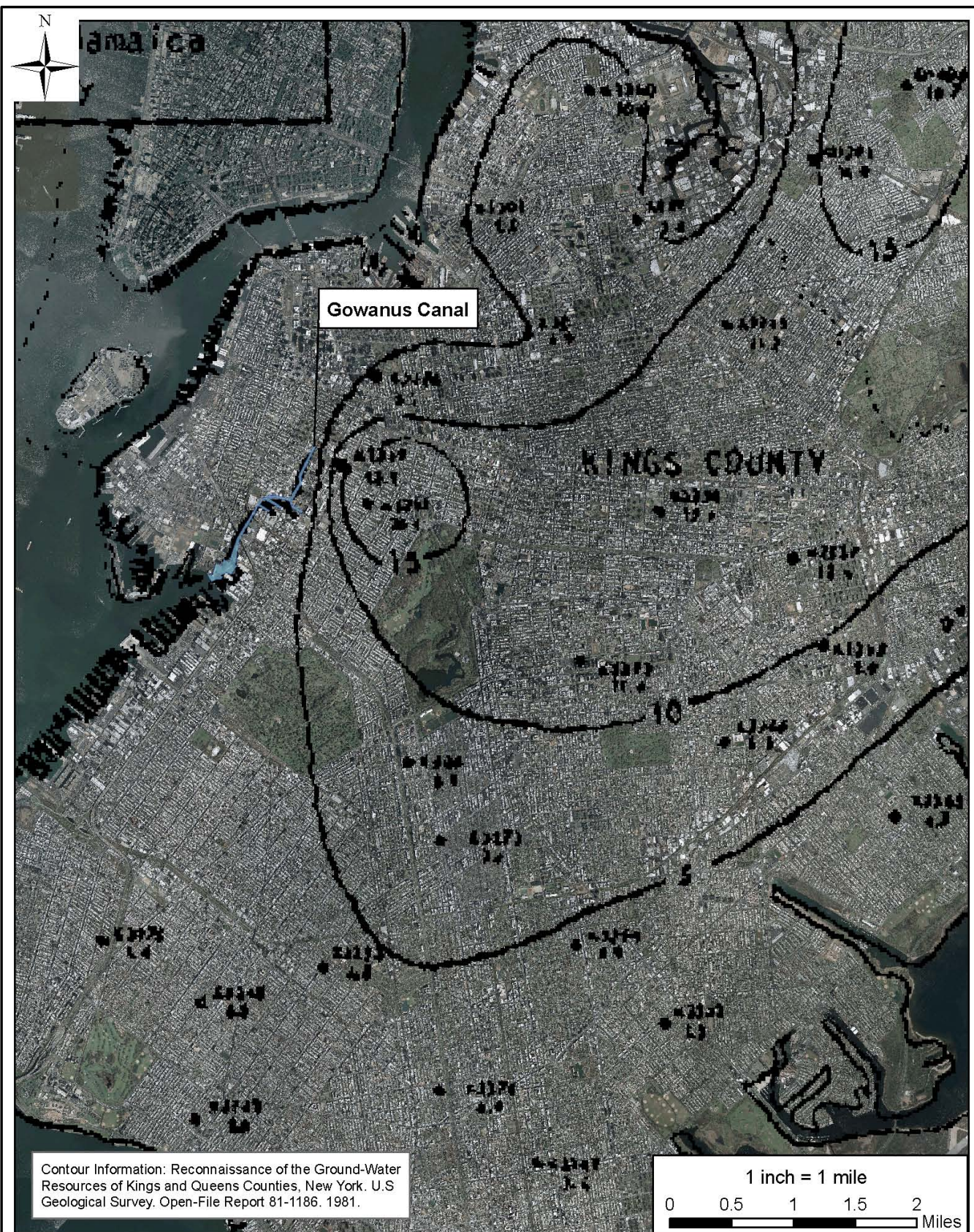
1. Steel/Carbon Steel/Iron
2. Galvanized Steel Alloy
3. Stainless Steel Alloy
4. Fiberglass Coated Steel
5. Steel Tank in Concrete
6. Fiberglass Reinforced Plastic (RFP)
7. Plastic
8. Equivalent Technology
9. Concrete
10. Urethane Clad Steel
99. Other - Please List on a separate sheet including Tank Number

FIGURES









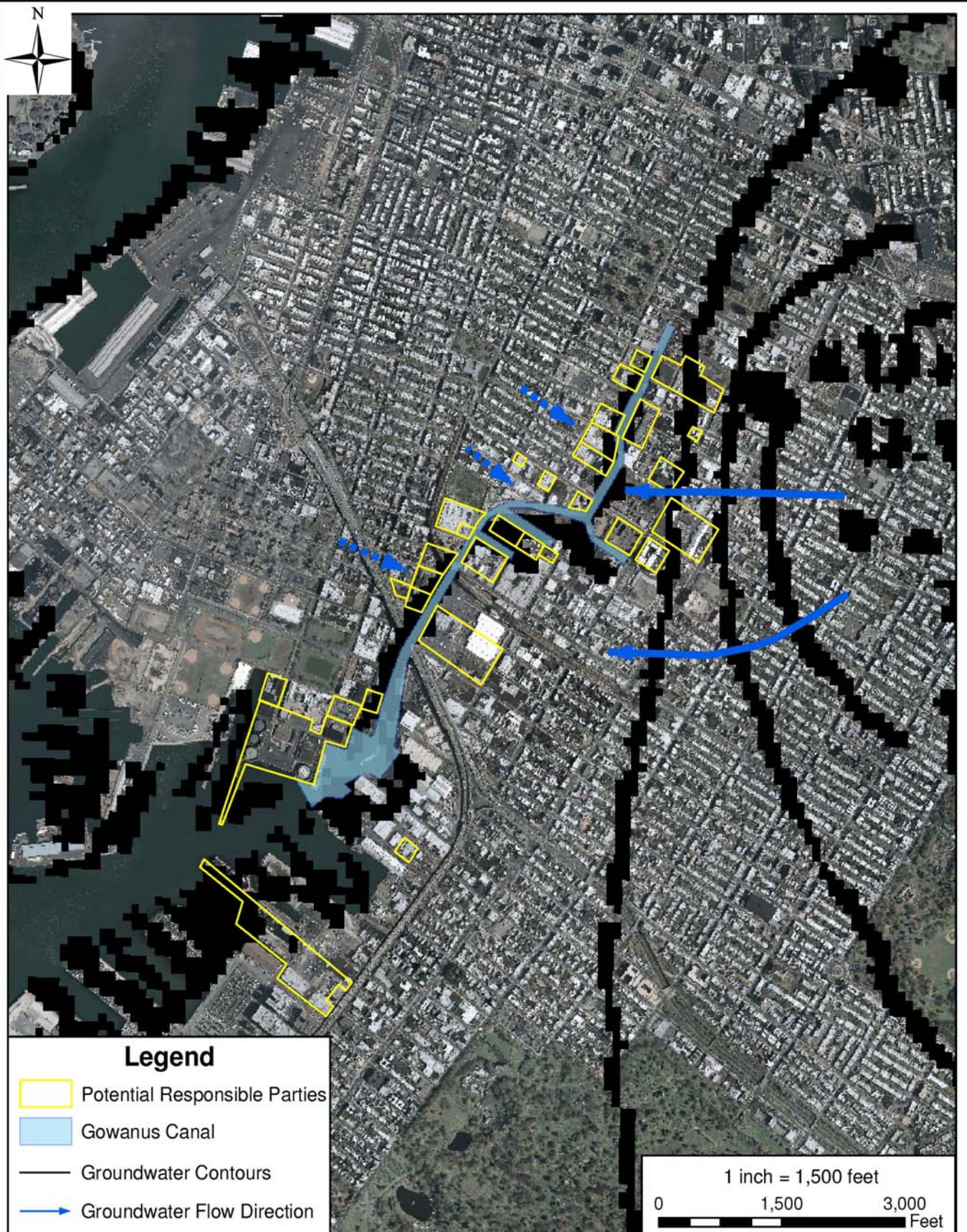


Figure 4 - Gowanus Canal Centerline Cross Section

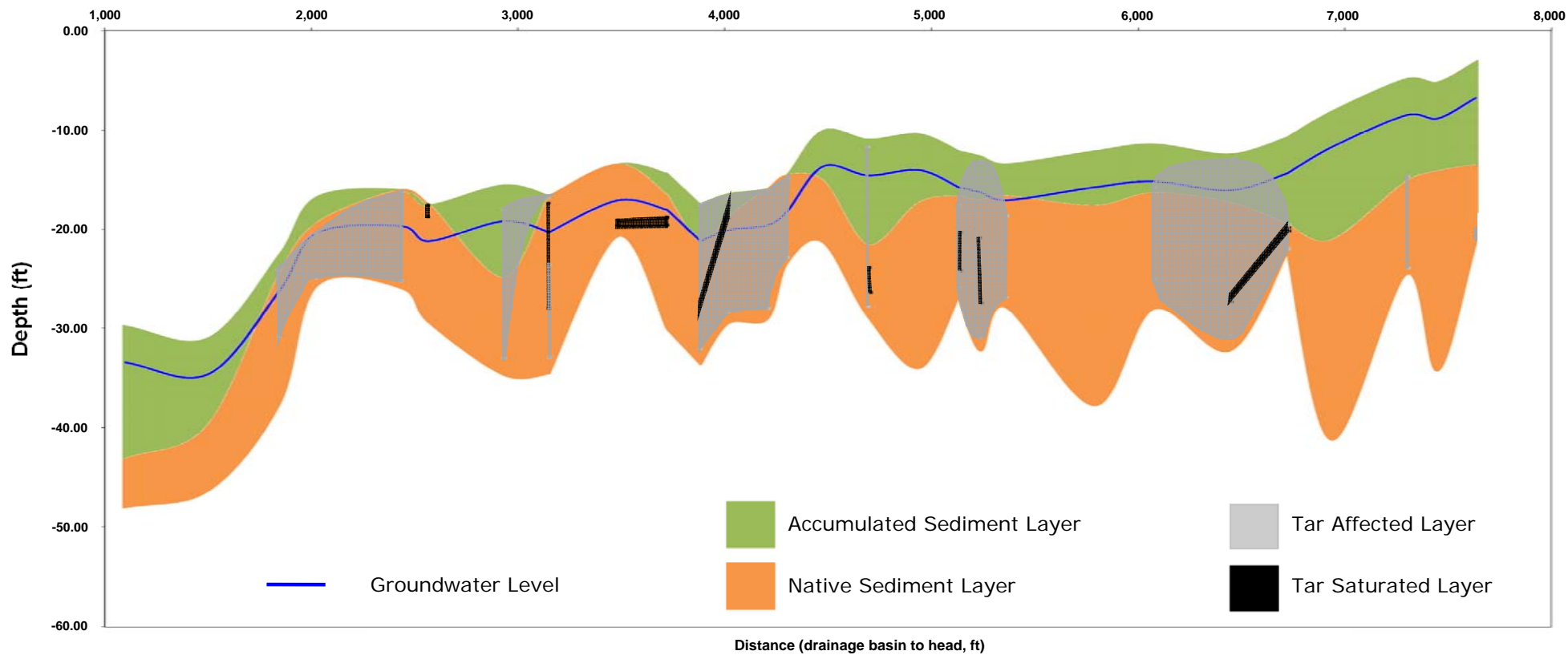


Figure 5 - High Priority Upland Industrial Properties Around Gowanus Canal



Figure 6 - NYSDEC BCP, VCP, & State Superfund Sites Near Gowanus Canal



Figure 7 - NYSDEC Active Spill Incidents Near Gowanus Canal



Figure 8 - NYSDEC PBS Facilities Near Gowanus Canal



Figure 9 - NYSDEC CBS Facilities and MOSF Near Gowanus Canal



APPENDIX A

USEPA Draft Monitoring Well Installation Plan

DRAFT
Monitoring Well Installation Plan

Gowanus Canal Proposed Superfund Site
Brooklyn, NY

I. Introduction

An upland hydrogeological investigation will be implemented in support of the Gowanus Canal Proposed Superfund Site investigation in Brooklyn, New York. The purpose of the upland investigation is to evaluate groundwater to surface water interaction (GSI) and the potential for groundwater contributions to the Gowanus Canal surface water body. The hydrogeological investigation will consist of installing a network of monitoring well couplets in the shallow and intermediate depth overburden soils to obtain data for the groundwater relative to the base of the canal. Monitoring well couplets consisting of both a shallow and an intermediate well will be positioned at locations immediately adjacent to the canal and several hundred feet inland in order to evaluate both vertical and lateral groundwater flow characteristics. Details of the proposed investigation are provided below.

II. Scope of Work

This monitoring well installation plan is divided into the following tasks:

- **Task 1** Property Access Support
- **Task 2** Drill, Install, and Develop Monitoring Well Network
- **Task 3** Groundwater Sampling

Task 1 – Property Access Support

The proposed monitoring wells have been located to the extent possible within public street and sidewalk areas. Some well locations, however, are proposed on private property due to the needed spatial distribution and areal coverage for the well network. This task includes activities related to securing right-of-way access for installation of the monitoring wells from either New York City or private property owners. The general activities that will be completed as part of this task will consist of the following:

- Contact the City of New York Tax Assessor's office to obtain Block/Lot maps for the parcels of interest and identify the owners of the properties.
- Obtain from New York City, complete, and file applications for access based on the site and ownership evaluations.
- Work with / support USEPA in contacting property owners to secure property access agreements.

Task 2 – Drill, Install, and Develop Monitoring Well Network

Geology within the study area consists of glacial outwash deposits, alluvial deposits and fill that are laterally and vertically heterogeneous. Characterization will be dependant on adequately evaluating these horizontal and vertical variations throughout the length of the approximately 1.5 mile long canal (i.e. approximately 3 miles of canal frontage including the east and west sides of the canal).

Figure 1 depicts the conceptual layout for the monitoring well network including installation of 63 new wells along approximately 3 miles of canal frontage plus use of existing monitoring wells. Note that each point on the figure represents a well pair consisting of two wells (shallow and intermediate) except where noted at the Former Fulton MGP Site. The distribution of the proposed wells (new and existing) is summarized below:

- Use approximately 13 existing wells at former Fulton, Carroll Gardens and Metropolitan MGP sites
- Add 3 intermediate depth wells at Former Fulton MGP site to supplement existing shallow wells.
- Install 15 well pairs (shallow & intermediate) for lateral distribution on west side of canal
- Install 14 well pairs (shallow & intermediate) for lateral distribution on east side of canal
- Install 1 well pair (shallow & intermediate) at the head of the canal by Butler St.

Monitoring wells will be constructed of 2-inch diameter Schedule 40 PVC well casing with a 10-foot long machine slotted screen with 0.01-inch diameter (10-slot) slotting. The wells will be completed using 9-inch diameter flush-mount manhole completions with locking well caps.

The shallow wells will be installed straddling the water table which is estimated from previous work as occurring between 6 to 10 feet below ground surface (bgs) near the canal and 15 to 18 ft bgs further inland. The intermediate depth wells will be designed on a case-by-case basis depending on local ground surface elevation and depth of the canal bottom (i.e. the elevation of the top of the native sediments underlying the canal as opposed to the top of the soft “mucky” accumulated recent sediments). The intermediate wells will be designed so that the top of the 10-foot long screen is positioned approximately 5-feet below the top of the native sediment at the bottom of the canal. The top of the well screen for the intermediate depth wells is estimated to range from 25 to 40 ft bgs. Information on the depth of the native sediments in the canal will be derived from the sediment coring investigation in the canal.

Drilling operations will be performed using a hollow stem auger (HSA) drill rig utilizing 4 ¼-inch inner diameter augers. Continuous soil coring will be performed utilizing 2-inch diameter by 2-foot long split spoon samplers (or equivalent) to facilitate geologic observations at the drilling locations. The lithology of the soil cores will be logged and each core will be screened utilizing a photoionization detector (PID) and visually observed for signs of contamination. Photographs of soil cores will be collected as needed. Soil samples for laboratory analysis will not be collected.

The newly installed wells will be developed using a surge block and submersible pump. The monitoring wells will be surveyed (location and elevation) and incorporated onto the overall site plan.

Investigation derived wastes (IDW) consisting of soil cuttings and groundwater will be managed. The drilling subcontractor will containerize soil and water wastes in 55-gallon drums at the work-site and transport them the short distance to the staging area without manifesting. Waste profiles will be generated based on sampling of the IDW prior to off-site disposal.

Task 3 – Groundwater Sampling

The comprehensive network of existing and newly installed wells will be used to evaluate groundwater conditions under a groundwater monitoring program consisting of:

- Synoptic water elevation measurements in wells and canal – monthly for 1 year
- Continuous water elevation data logging in select wells and canal for 1 week to evaluate tidal influences
- One round of groundwater sampling for TCL/TAL parameters (incl. Hg and CN) performed a minimum of two weeks following installation and development of the new monitoring wells. Sampling will be performed using submersible pumps following USEPA's low-stress groundwater sampling procedures.

APPENDIX B

USEPA Draft Monitoring Well Location Plan

